The Dental Digest.

Vol. XI. CHICAGO, JULY, 1905. No. 7.

Original Contributions.

SANITARY ARTIFICIAL DENTURES.

BY N. S. HOFF, D. D. S., ANN ARBOR, MICH. READ BEFORE THE SOUTHWESTERN MICHIGAN DENTAL SOCIETY, AT KALAMAZOO, APRIL 11-12, 1905.

The occasion for this paper is not an overpowering conviction that it is a long overdue message that ought to be delivered to this particular audience in preference to some other, but is a natural sequence following an order from a superior officer to present a paper to this audience on some subject of value and interest at this time. The order came so peremptorily, and with no previous warning, that I felt exceedingly concerned to select a topic that would interest, to say nothing of edifying, but two or three aggravated cases of unsanitary mouths presenting themselves helped me to elect this theme for your consideration.

The first thought to which I wish to call your attention is the almost criminal neglect of oral sanitation by people generally. Individuals who are scrupulously careful to have their faces and hands clean, their shoes blacked, their clothing well brushed, and other parts of their adornment in at least a fairly good state of cleanliness seem to forget their "false teeth" altogether—at least they neglect to give them a proportionate amount of attention. I recently had a call from a very cultured gentleman on a professional matter, and was much surprised to see the condition of a partial plate he was wearing. There was conclusive evidence that this man had no idea that it was incumbent upon him to take into account his plate when making his ordinary toilet. The condition was so disgusting as to render it practically impossible to render a proper service without first thoroughly disinfecting the whole mouth as well as the operative field.

One of the most common causes of unsanitary surroundings,

resulting sooner or later in pathologic conditions, is a poorly-adapted or fitted plate. This is especially aggravating if it be a miserably-finished rubber plate for a partial case. You have all seen such plates which, because they do not fit close to the teeth, or because of very thick borders, provide spaces or pockets into which all the refuse of the oral cavity gradually gravitates and, remaining undisturbed, soon becomes a hotbed for growing myriads of disease-producing organisms. The blame in such cases does not rest wholly with the patient, as in many instances it is practically impossible for him to keep his plate clean even if he were ever so well disposed. The man who made the plate was a rascal, and did only so much work on it as he was compelled to do in order that he might collect a fee for it, and of course he had no time or inclination, even if he possessed the ability, to instruct the patient how to care for it. He certainly did not measure up to the standard of the true professional man, who gives himself wholly to ministering in the best possible way to such as may place confidence in his skill and professional integrity. A clumsily-constructed artificial denture of any kind is an abomination, and the dentist who is not able to do this work skillfully had much better not try to do it at all, but confine himself to such work as he may do acceptably. Someone has said that three out of five dentists ought to take a post-graduate course in prosthetic technics. While this proportion is probably large, there undoubtedly are many practitioners who have no taste for this branch of their art and never do a creditable piece of work. The queer thing about it all is that most of them think they can make plates as well as anybody. They may be able to make plates as fast as anybody, but they do not know how, and many of them will never learn to adapt a useful and harmonious prosthetic appliance.

Next to the badly-constructed plates are the ones which do not fit the mouth as they should. Plates are often worn by patients that do not at all fit their mouths. They perhaps never did fit as they should, but more frequently they have been worn longer than they should have been. In some cases the mouth changes rapidly and a plate may become a misfit in a short time; such cases are usually reported and the matter adjusted with a new plate, but in many cases patients have worn a plate for ten or

fifteen years, and the gradual absorption which has been going on has given the wearer time to become accustomed to the changes. The lack of adhesion which kept the plate in place, because of close adaptation, is not missed, because the patient learns to use the tongue and lip and buccal muscles to keep it in place while talking and eating. It is remarkable how expert some people become in this matter, but it is always at the expense of proper function, of distinct articulation and adequate mastication. In some cases it is a real trial to sit at table with a person who is so intent on controlling a pair of badly-fitting plates that he either eats little or nothing, or disgusts everybody with his clatter and facial contortions. I know a very nice old gentleman who would be an agreeable guest if he only had a set of teeth that did not need so much attention. As it is he cannot carry on a conversation of any length without great embarrassment. I have often wanted to invite him to come to me for professional service, but have not had the courage to do so. Such a case—and there are many as bad, and possibly some worse—is not only a great misfortune from the social standpoint, but it is even more to be deplored from its sanitary aspect. The oral structures cannot be healthy in such a mouth, because of the continual irritation, and because of the filthy accumulations that must inevitably accompany it. No dentist is justified in compelling a patient to put up with such a condition of affairs. If it is the patient's fault, it seems to me that it would not be a breach of good manners or professional etiquette to remonstrate with such people and show them the bad effects that are sure to follow such a condition, and earnestly urge them to change the condition to one that will bring personal comfort, and lessen the menace to public health as well as good manners.

Then there are the old plates, which have been worn for thirty years—who would think of wearing a shirt or a pair of boots for thirty years? These old veterans have often been repaired three or four times, and have so degenerated structurally that they are little better than so much punky wood. They are simply saturated with accretions of ages. Can they be healthy, even though the patient can masticate his food satisfactorily with them? How easy it is to refit such plates with new vulcanite or other material and without disturbing the occlusion or form. By this means a

new and wholesome plate which can be made to fit the mouth perfectly may be substituted at small expense and great advantage to the patient. How many dentists feel called upon to look after their patients' interests in such a way? Most of us are so busy repairing damages which are imperative that we overlook these cases, and patients do not realize that they should be given any attention. They are not so much to blame as the dentists for much of this condition. Patients think that as long as they can manage to masticate food their plates are all that they ought to be. This comes from the fact that dentists are accustomed to tell patients that the work they do is permanent, meaning that the life of the filling, crown or plate is indefinitely a long one. Patients frequently inquire when arranging for sittings if the dentist warrants his work—indicating that they have an idea it should last a long time.

Perhaps the most inexcusable and prolific cause of pathologic, or at least unhealthy, conditions of the mouth is to be found as a result of patients wearing even new and well-adapted plates the palatal surfaces of which have not been properly finished. Many dentists seem to have an idea that no attempt should be made to finish the palatal surface of rubber plates for fear that some of the detail will be removed and the adhesion of the plate be lost. It is not uncommon to find the plate not only left just as it came from the vulcanizer, but exceedingly rough, caused by the fact that the model was poorly made and no effort at all was made to provide a hard and smooth surface upon which to vulcanize. This surface may also be further mutilated with deep suction chambers and other horrors to increase its irritating capacities. I appreciate the fact that it would be a difficult and laborious task to undertake to polish the entire palatal surface of an eight-dollar rubber plate, so that it would be as smooth and comfortable as a gold plate. This may suggest the idea that a dentist has no right to inflict eight-dollar rubber plates on his patients. It may be that he would feel justified in receiving a sufficient fee from a grateful patient should he take the trouble to explain to his patient the value of such an additional expense. There is really no excuse on such grounds for much of the discreditable work one frequently sees. If reasonable care be taken to secure good

models, and before packing the vulcanite proper preparation of the surface of the model with tin foil or liquid silex be made, the surface of the plate will come from the vulcanizer comparatively free from irritating projections. It can then be polished without much work so that an agreeable, smooth, hard surface will be presented to the mucous membrane, and what is of prime importance, a surface which will not invite accumulations of the foodstuffs or vitiating mouth secretions.

Much has been said and written about the deleterious action of the mercuric coloring matter of red rubber in producing stomatitis and other affections of the oral mucous membranes. The probabilities are that little or none of the unwholesome oral conditions is due to this cause. The mechanical and structural defects are amply sufficient to cause great disturbances, and in some cases it does seem as though the oral tissues are wonderfully immune and resistant, or they would certainly succumb to the continued mechanical and unsanitary irritations to which they are subjected.

Rubber plates are too often inadequately vulcanized. They are made thick and clumsy, with little or no regard to the comfort of the patient and not much conception of the stress to which they will be subjected in use. Then they are vulcanized in the shortest possible time, and insufficiently to produce a hard and dense structure which will not absorb the secretions in which they are continually bathed. Many times the plates have degenerated under the rapid and excessive application of the heat, producing apparently perfect plates on the surface, but within a sponge, and in case no proper care has been taken to provide constant spring pressure while vulcanizing the rubber draws away from the teeth while hardening, leaving spaces which soon fill up with secretions to ferment and irritate the mouth, and it may be to cause a nauseating odor which no ordinary disinfection or cleansing will eradicate.

I have not enumerated all the causes, or the details of any, which go to make up the defects in artificial dentures as generally made at the present day, and it may be that as long as this subject remains on the present commercial basis, and the better men in the profession do only so much of this work as they are

compelled to, and because of lack of practice or knowledge they do it in so unskillful a manner, there may be no remedy. Intelligent people if made acquainted with the consequences of inferior work along this line would certainly acquiesce in good work and pay reasonable fees. It seems as though it were high time this branch of our profession was receiving some attention from those who are capable of doing a skillful piece of work and have some conception of how such work ought to be done to secure the best results. Every other department of practice seems to have made progress except this, and it has appreciably degenerated in the last twenty-five years. It may be that sufficient interest can be worked up from the standpoint I here present. It is very apparent that little or no improvement can be looked for from the mere technical aspect. This department seems to be drifting through the commercial laboratory and hired *"technicher"* entirely out of the hands of the educated dentist. That such a result should come to pass would be deplorable enough, and the only way to stop this tendency is for the profession to realize the importance of the application of all accumulated sanitary knowledge as well as technical skill to this important department of dental practice. There seems to be a decided reaction from the conspicuous and inartistic gold crown and bridgework to more esthetic and sanitary practice; may we not hope and work for a reform of the present ideas and practices in regard to platework? "It is a consummation devoutly to be wished."

EXPERIMENTS IN IMPRESSION-TAKING.

BY STEWART J. SPENCE, D. D. S., CHATTANOOGA, TENN.

With the purpose of trying to determine whether a plate exactly fitting an upper jaw, or one slightly smaller than the jaw, gives the better adhesion, a model of an edentulous jaw was made in rubber, having non-vulcanizable rubber on its lingual, buccal and labial surfaces and—to impart stiffness—a base of vulcanized rubber. To further give stability it was filled with plaster, and in order that there should be no space between plate and plaster through expansion of the latter a non-expansive plaster was used for this purpose.

A secondary purpose in making this dummy model was to test it in impression-taking, it offering opportunities for observation during this operation which the human mouth does not. It is only the experiments connected with this second purpose that the present paper records.

MODELING COMPOUND.—Heated some compound and placed same in an upper impression tray, then pressed the above-mentioned dummy model into same. This was repeated many times, and three things specially were observed:

First.—Unless a slight digital pressure was made on the compound to bring it in contact with the buccal and labial surfaces it failed in places to touch them, the spaces extending down to the level of the border of the flange of tray. So slight, however, was the pressure needed to produce contact that it seems probable the lips and cheeks afford sufficient pressure to avoid error here, except perhaps in protruding alveolar ridges. Higher flanges to trays would doubtless be safeguards against this tendency of modeling compound to not hug buccal and labial surfaces. For the protruding ridge when it appears, as it usually does, in the anterior portion of the jaw, it is well in taking the impression to press both backward and upward simultaneously. In doing this, however, care must be exercised to not press backwards after having concluded the upward pressure, for this would withdraw the compound backward from the palate in the rugæ region.

Second.—The slight shrinkage of modeling compound in cooling from about 100° F., at which it is removed from the mouth, to about 70° F. (the ordinary temperature of a room), was exhibited in a slight space at the palatal dome between the dummy model and its impression. This space was scarcely visible, but became evident when a solution of soap was placed between dummy and impression, more of the solution oozing out and (on relaxation of pressure) running in again at the dome than at the heels. In some of the impressions this space did not appear, which may be accounted for as follows:

Third.—It was observed that as long as equal pressure in taking the impression was applied on each ridge the dummy model and impression remained, as far as could be seen, in contact, but as soon as pressure was removed from one ridge while continued on the other a space appeared on the side from which the pressure was

removed, and if now the other side was so treated, each side showed space and the contact was only at the palatal dome. By trimming away the compound from the posterior border of an impression, so as to bring clearly into view its line of contact with the dummy, and then, after resoftening said impression, applying this unequal pressure above described, the model and compound could easily be seen to separate from each other on the side relieved of pressure. A space of 1.0 mm. could readily be thus produced. When the impression had been made to adhere to the tray this space was greater than when not so adhered, because in the latter case the compound became separated from the tray as well as from the model, and so the total space produced was distributed between the two and not all between impression and model. I could not observe that the adhesion of the impression to the model drew the former at all out of shape in separating them.

The conclusions I would draw from these observations are, that compound should be used sufficiently soft to permit of the ridge being sunk well below the border of tray, and then, having pressed the impression well home, the operator should hold it as steadily as possible with both hands until removed, this pressure being applied as much as may be inside the arch, so as to reduce leverage.

WAX.—The wax used was considerably stiffer than pure beeswax, being a mixture of any and all kinds of wax that come to a dental office. Results of experiments with it were very similar to those with the compound, but having less flow than this it did not allow so much space between dummy and impression at heel from unequal pressure, and was not so easily made to conform by digital pressure to buccal and labial surfaces. For the same reason it had less tendency to encroach on soft palate. Like the compound, it contracted in cooling, and to about the same extent. In every impression the soap solution oozed more freely from dome than heels. Taken altogether, it seemed slightly superior to compound for impression-taking.

PLASTER OF PARIS.—Results with this were very different from the others. There was no tendency to not hug the buccal and labial surfaces; the plaster while soft adhered to the model, so that when pressure was removed from either side, and thus the other side of model was drawn up, the plaster followed the model, and only when partially set did it refuse to do so, and even then it required

much more pressure to create a space than did either of the other two materials. This gave at first perfect results, and if a plaster model had been immediately taken from this impression a correct copy of the jaw (as far as the impression is concerned) would have been obtained, but in thirty minutes the impression had expanded about one per cent of its diameter, its adaptation to the dummy model was lost, and a space of over 1.0 mm. existed between the plaster and either heel of dummy when the other heel was forced to place. Thus the model rocked on the palatal dome. As some plasters, especially the more rapid in setting, undergo much of their expansion before the impression can be removed from the mouth, the dentist using plaster of Paris for impression-taking, and wishing to avoid the enlarging of plate resulting from the expansion of the impression, should use a slow-setting plaster and pour the plaster for the model without any delay. A further test was made, using Spence's plaster (non-expansive) for the impression, with results perfect. Experiments were then made to determine the amount of adhesion of these four impressions to the rubber model, and first the amount of traction required to produce a separation was found by means of a common weighing scales—the little spring and hook affair. Impression and model were liberally coated with a soap solution in lieu of saliva. *Results:* The wax and modeling compound varied but little from each other, separating at about 1¼ pounds and ranging in about ten trials each from 1 pound to 1½ pounds. The plaster of Paris impression gave an average of 2¼ pounds, which, seeing that neither of its ridges had contact with the model, was somewhat surprising, but tended to confirm the theory that plates which fit well only on the roof of palate often offer considerable resistance to direct traction, perhaps because they do fit that part well. At the same time a mere touch on the ridge may dislodge them, and they are much inferior for mastication to plates which bear lightly on the palate, as did the wax and compound impressions. The Spence's plaster impression sustained a traction of 5½ pounds.

Indirect traction was then tried—that is, only one heel was drawn upon. *Results:* Wax and compound, 1 pound each; plaster of Paris, 1¼ pounds; Spence's plaster, 3 pounds. Here the difference between the wax and plaster of Paris is greatly reduced.

However, plates are not dislodged by downward traction, but

rather by upward pushing, and an attempt was made to test the four impressions for this by pressure applied over ridge, but here I had no means of measuring or weighing the force required to separate dummy and impression, and can only give estimates. The plaster of Paris impression endured only a few light touches before falling, a touch of perhaps ¼ pound; the wax was much better, and the compound better still; while that of Spence's plaster could not be dislodged in this way. These experiments show that a plate which falls a little short of the palatal dome is to be preferred to one that bears a little too heavily upon it, and they seem to teach that one which exactly fits both ridge and dome is superior to either of the others. However, I am not satisfied that this last is the fact in the living subject, as the soft rubber-covered model is not subject to change on pressure as is the living membrane, and it is probable that a plate which at first falls a little short of the dome may by a compression of the comparatively soft tissues of the ridge eventually fit up snugly to the palate, and then be more stable than one which exactly fits at first but afterwards presses too hard on the bony palate. This problem the writer hopes to be able to study further.

ORAL HYGIENE

BY GEORGE EDWIN HUNT, M. D., D. D. S., INDIANAPOLIS. READ BEFORE THE NORTHERN INDIANA DENTAL SOCIETY, AT HUNTINGTON, OCT. 18-19, 1904.

The subject of oral hygiene is constantly assuming greater importance in the minds of the progressive portion of our profession, and the signs of the times point to it as forming a considerable part of the practice of a certain class of operators in the future. Its importance can scarcely be exaggerated, especially in the United States.

There is no doubt that an all-wise Providence took into account the necessity for oral cleanliness in forming the human mouth and its correlated parts, but unfortunately man and his boasted civilization have done much to upset the design of the Creator of things. It was undoubtedly intended that the teeth should be regularly arranged in the arch, touching each other at a mere point only, and that the triangular spaces between the contact points

and the alveolar process should be filled with gum tissue. Given such arrangement in a perfectly healthy mouth with well-formed teeth, and but little effort is necessary to maintain a cleanly condition. During mastication the food slides from the occlusal surfaces down the lingual and labial or buccal, without getting wedged between the proximating surfaces. I have seen mouths in which the simple use of a tooth brush and water was ample to maintain a seemingly perfect condition. Of course this presupposes a normal systemic condition also, and these mouths are the rare exception, but the fact that they exist at all is evidence that the Creator started mankind on the right tack and that it is man's own work which has brought about present conditions—which brings me back to a consideration of what civilization has done for us in this matter..

The present methods of cooking foods were not included in the general scheme of life as at first promulgated, for it is evident that a more active use of the dental organs was intended than they now usually get. The large amount of soft and comminuted food in use in these days does not permit of the vigorous use of the teeth and masticatory muscles that would prove so beneficial in preventing diseases of the peridental and gum tissues and in cleaning the surfaces of the teeth. All this makes it necessary that greater care should be exercised in cleansing the oral cavity, but there is still another factor that in my opinion is of even greater importance in summing up the causes of the great amount of caries found in the mouths of the American people.

I believe that steam is largely responsible for the condition of the mouths of the American people, or, to carry the thought a little further, I am rather inclined to favor the conclusion that Fulton, the builder of the first steamboat, and Stephenson, the builder of the first locomotive, are the real fathers of American dentistry. The modern uses of steam as applied to transportation have made it so easy and so cheap for people to travel that journeys formerly considered absolutely impracticable except under great necessity are now undertaken on the slightest provocation. No one thinks much now of a journey across the continent, and a trip to Europe is no more expensive to a resident of an eastern state than a trip to San Francisco. The ease with which large distances may be covered by steam-driven carriers and the smaller ex-

pense incurred in travel have resulted in people coming to this country from all over the world by thousands. Now a change of climatic conditions alone is often sufficient to produce serious depreciation in the tooth structure of a race, as is evidenced by the effect of a residence in India on the teeth of the English and in the Philippines on those of the Americans, but when we add to that the tendency of these people to intermarry and beget children the inclination to tooth deterioration is immensely augmented. The pure races have ever the best teeth. So, I repeat, the invention and perfection of steamboats and railroads have been the great factors in making us a cosmopolite people, and this mixture of breeds, coupled with a decided change in climatic conditions for many of the people, has resulted in a race with teeth requiring unusual attention, and this latter cause has produced the logical effect, that of building up American dentistry, therefore Fulton and Stephenson are the real fathers of American dentistry.

But it is the condition and not the theory that confronts us and a serious condition at that. There is already a small class of patients in this country that are able and willing to pay well for having dental caries prevented in their mouths. This class may be greatly enlarged by judicious education, and I think the time will eventually come, as I said in the beginning, when a large part of the practice of some dentists will be the maintenance of oral cleanliness to prevent caries.

When this time comes, and it is coming faster perhaps than you are aware, experience, experiment and deduction will formulate the proper course of treatment for individual cases. If I were to forecast the future I would predict that the prophylactic dentist has his laboratory filled with test tubes, culture dishes, reagents, staining solutions, a microscope, culture media, and the various paraphernalia of a chemical and bacteriological laboratory, rather than with electric lathes, plaster, polishing devices and a vulcanizer. The patient's saliva will be subjected to analysis every three months. Cultures from the oral bacteria will be made once a month or oftener if the need exhibit itself. The treatment will be manual or mechanical, chemical and dietary.

The former will consist of periodic cleansing, the interval to be determined by the chemical and bacteriological investigations of the oral cavity by the dentist, supplemented by such cooperation

as the patient is capable of giving. These cleansings will consist of careful and painstaking polishing of the exposed surfaces of the teeth with pumice or other fine abrasive, applied manually by means of orange-wood sticks or other convenient appliances Polishing of the tooth surfaces will be supplemented by manual massage of the gums, tongue and other mucous-covered surfaces in the oral cavity, an effective and palatable wash being used in conjunction with the physical exercise of the parts.

The chemical treatment will no doubt consist of the wash used in connection with the massage as just mentioned, and of an effective wash to be used by the patient in the interval necessarily existing between the manual cleansings of the dentist. Experiments conducted by the writer last winter, the results from which were given to the profession in a paper read before the New York State Dental Society (DENTAL DIGEST, November, 1904, p. 1341), prove to the writer that no known drug has the power of controlling all forms of oral bacteria without injury to the tissues and to the function of digestion, equal to that of mercuric chlorid in the strength of one to twenty-five hundred. I predict that in those mouths requiring an especially effective wash to decrease the ravages of caries mercuric chlorid will be a valuable constituent of the prophylactic dentist's armamentarium. In many mouths it will not be indicated, but in those mouths passing through the stage of extreme susceptibility it will be prescribed.

Further effective chemical treatment will be found in the use of silver nitrate, bathing the crowns of the teeth with strong solutions of it. This treatment, advocated by Dr. L. C. Bryan of Basle, Switzerland, is highly beneficial in preventing the initial lesion in fissures and sulci, and will doubtless form a part of the general plan for the prevention of caries.

Dietary measures may become necessary if it should be found that an excess of carbohydrates in the food influences the proportion of carbohydrates in the saliva, and that decomposition of the carbohydrates in the saliva is responsible for the initial lesion of caries. I do not imagine that dietary treatment will ever become as important a factor in this work as will the manual cleansing and the chemical treatment. If further experimental work proves the initial lesion of caries to be dependent on the fermentation of carbohydrates in the saliva, and proves that the quantity of car-

hohydrates in the saliva is proportional to the amount in the food, it is possible that in extreme cases a system of diet might be followed with beneficial effect.

I do not anticipate that there will be a total cessation of filling operations when preventive dentistry is practiced, for it is highly probable that the best efforts in some mouths will not result in complete immunity, and of course the number of patients that will submit to the rigid requirements will be limited after all, but I again predict that many dentists in the future will devote a large part, if not all of their time, to the prevention of caries along scientific lines.

Discussion. *Dr. C. W. Orland,* Anderson, Ind.: Dr. Hunt has certainly given us a lucid description of the hygienic conditions that confront the average dentist daily. His description of the cause of it is good and I believe voices what most of us think on the subject, namely, that modern civilization is the cause of most of the unhygienic conditions that we have to deal with. When we find apparently healthy patients, who give every reasonable care and attention to their mouths and teeth and who still have recurrent caries and an unhealthy condition in the mouth in general, we are forced to believe that modern civilization with its soft food and faulty cooking must have something to do with the matter. I believe there is no one thing in dentistry of which the people display such a colossal ignorance as the need of a better general condition of the mouth, other than keeping the teeth filled, and the probable results to them if such is not obtained. Our predecessors must have been very derelict in presenting the necessity for this, as it is no uncommon thing to see mouths that show the evident attempt of the patients to keep their teeth, but the gums are in a dreadful condition and getting worse, and must have been so for years. I think all this is due to the failure of the dentists to sufficiently impress upon their patients the necessity of having a healthy mouth, besides keeping the teeth filled, and their consequent inability to collect a sufficient fee for what work they did in this direction, and, inasmuch as few men work very long for love only, this class of dental work has been seriously neglected.

I have never employed mercuric chlorid as a mouth wash, and have always believed it a highly dangerous drug to use in such a

way. However, I have faithfully prescribed many of the mouth washes on the market with, I must say, very unsatisfactory results—not on account of the inefficacy of the preparations themselves, but because of my inability to get patients to use enough of any of them to bring about the desired result. They are all too expensive to use with regularity, and because of my inability to procure their constant employment I have for several years advocated the use of a solution of carbolic acid and soda, putting about twenty-five drops of carbolic acid in a glass of water and adding about a half a teaspoonful of soda. This is cheap and easy to make, its use leaves the mouth sweet and clean, and my patients stick to it.

Dr. G. V. Black, Chicago: The subject of this paper is certainly of much importance and one which you should study with a great deal of care. It of course includes the prevention of caries, and this seems to be the principal idea in the mind of the writer. The cases of caries in youth more than outnumber the cases in after years, and especially is this true after the age of thirty or forty.

There is a new work of Dr. Miller's which will be out soon. I saw it in St. Louis and read another extended paper in which he deals with the streptococcus of the mouth and particularly with the use of alkali to destroy it. Dr. Miller has tried every means in logical science for the prevention of bacteria in the mouth and has found it cannot be accomplished, for they will grow in spite of everything that we can do and no matter what kind of wash we use. We can remove them almost entirely for a moment, but before the next meal they are there again.

I have had occasion to examine a great many skulls of Indians from this country and have found that the teeth of those people were in better condition than we find in our own race. The author of the paper says that the purer races have the best teeth and from that I differ a little. Take it in Nashville, where there is very little mixture of races, and I do not know that their teeth are any better than where they are badly mixed. Dr. Miller took that matter up before the Congress at St. Louis and it is generally conceded that he fully established the point. The time was when our rich people suffered more with their teeth than the poorer classes, but that time is past. Now the better class do not suffer as much as the poorer class, for as a rule the former take better care of their teeth and have them properly treated.

I have been in the habit of associating Chapin A. Harris with the fathers of dentistry in this country. I do not believe that I am mistaken.

The use of mercuric chlorid and silver nitrate, as has been described, if rightly and properly followed up might produce very good results, but I consider mercuric chlorid a very dangerous drug and it should be used only by one experienced with it. Silver nitrate applied in a general way will produce good results, as it will not stain the healthy enamel, but will blacken the decayed spots, and if there is decay upon the labial surfaces it will show plainly.

Until we are able to find remedies that can be applied for the prevention of caries we will not be able to keep it from the teeth. Special care should be taken of the teeth in the early treatment of caries, and the manner of chewing the food should be watched, as many of our people are in the habit of rolling their food up and not chewing it well.

Dr. Hunt, closing discussion: I had reference to the poorer classes and not to the richer ones. I expected to show the use of silver nitrate and its effect. Mercuric chlorid is not considered a general wash, and I would use it only in extreme cases. I do not think there is any drug that will destroy all bacteria, but there is one that will greatly and rapidly reduce the number, and that is the wash of mercuric chlorid. One-half ounce is used and a little less than 1-100 is swallowed. It is not supposed that the drug should be swallowed, and only that portion is swallowed that remains on the teeth and finally goes into the stomach and is absorbed. I think that it will not be a great while before mercuric chlorid will be second to none as a mouth wash.

THE PEOPLE VERSUS THE DENTIST.

BY GEORGE ZEDERBAUM, D. D. S., CHARLOTTE, MICH. READ BEFORE THE SOUTHWESTERN MICHIGAN DENTAL SOCIETY, AT KALAMAZOO, APRIL 11-12, 1905.

Although much has been done during the last decade in dentistry to materially improve the relation between the public and the dentist, there is still need for more persevering work in educating the public as to what dentistry really is and how it should be valued; there still remains almost a Herculean task for the dentist who wishes

to still further improve the relation that should exist between the intelligent public and his profession. Even at this date there are perhaps no more than two people out of every ten who value or properly care for their teeth, and, as has often been said, each one of them has or should have thirty-two reasons for taking the best care of his teeth, and they are all in his own head.

How often a patient appears in our office, wishing immediate extraction of some offending, or even an offended, member of his masticatory force, when it could be readily repaired for a very small fee. But no amount of persuasion can induce him to have that repairing done, because, as he puts it, "It will have to come out eventually anyway, and I'd rather lose it right now than to pay for filling it and then again pay for extracting it."

Another one comes in and says to you, "Yank it out quick, doctor; it is decaying from the inside," and then comes the usual lengthy story that ever since he had his teeth cleaned by a dentist they commenced to rot right down and he cannot masticate his food any more. Still another may say that he'd rather lose his tooth than to sit in the dental chair two minutes and hear that buzz-saw. These and many similar, and to us nonsensical, reasons are heard almost daily in offices of a mixed clientele.

Only recently I had an appointment with a fifteen-year-old girl, whose mouth was simply filthy, many teeth requiring attention. She positively refused to keep the appointment, and her mother brought her in spite of her wishes. Of course the first thing I wanted to do was to clean her teeth as thoroughly as possible, but even that was out of the question, as she would not let an instrument touch her teeth, and the sight of the engine completely unnerved her. No amount of persuasion or explanation would do. As luck would have it, my wife brought my two-and-a-half-year-old daughter to the office just at that critical moment, and I immediately asked the young miss to vacate the chair for a few moments and called to my little one; she at once climbed into the chair, I fastened the napkin and went to work as if her little teeth were in actual need of the procedure. She had been there before and did not mind the scalers or the engine a particle. After the work was finished my fifteen-year-old patient consented to go through the same course, and mind you, without even a whimper from her. I gradually progressed toward the harder work

and am now devitalizing a tooth for her. The old saw, "Example is better than precept," proved true in this case, as it has in many others.

On the other hand, we encounter many cases which are exactly the opposite. Some patients cannot possibly think of losing a tooth, even a nasty, abscessed root; they would rather go on paying doctors' and druggists' bills to the amount of several times the necessary cost of relieving their lamentable condition, by judicious extraction of irreparable teeth and placing the mouth in a healthy condition. I remember two cases in my own practice where both patients had been advised to have immediate extraction of every tooth, if I may designate such remnants as teeth; but instead both cases went under the constant care of physicians for treatment of chronic stomach affections, the sufferers submitting to daily use of the stomach pump and dieting on hot water and toast. At last they both were obliged to return to me for relief, which was swiftly brought about by the extraction advocated a year previous.

Again, we very often advocate an extraction of some irreparable tooth and the patient exclaims, "No! No! I'll wait till it aches, then I shall have more grit to have it out," and in most cases that is just the time when he has the least, and the tooth crushes like an egg-shell even in the hands of the best extractors.

Occasionally a patient comes in with his mind fully made up to have a tooth removed, and the operation may be necessary, but he is trembling in his boots because he once heard that someone had a jaw broken in the extraction of a tooth. Knowing nothing further, he is strongly impressed by such talk, and regards the operation as a very serious affair, not knowing that a spicula of the alveolus may come away in the extraction of any tooth.

In this connection I can cite an amusing incident that occurred in my practice last summer. A young physician practicing in a small country four-corners called with an aching lower third molar, which under existing conditions I found advisable to extract. The man had his mind fully made up to that very expedient and the deed was done with no difficulty whatever, the tooth coming away clean and clear. The doctor, who was one of those big, fat and flabby sort of chaps, with no more nerve as far as his own personal injuries were concerned than a jelly-fish, carried on consid-

erably from what he termed his "after-pains." I placed a loosely rolled pledget of cotton saturated with chloroform in the socket, with instructions to remove it within a half hour. I expected him to be equal to that, but it seems he was not, as he at once went to a brother physician, who promptly removed it and packed the alveolus with morphin. This, as might be expected, coming in contact with raw tissues, raised havoc, general irritation and then much swelling, sloughing and pain set in, and, what perhaps worried him more than all else, it became impossible for him to open his mouth. These symptoms were exceedingly annoying because of the fact that he was a groom of only two weeks' standing and naturally wanted to be petted and to learn how much his young wife really loved him. She at once played the ministering angel act and with tears in her eyes sent him to bed. It was then that I received a hysterical telephone message which I am sure must have melted the wires at one end or the other. I left the office with my assistant, hired a conveyance and drove out to his home, expecting to find a corpse; but, thank heaven, he was not dead yet! I examined his mouth as best I could and nothing serious appeared to be the matter; he was not in any worse condition than everyone of us present could expect under the circumstances. On his way home the horse ran away, but he finally after much delay reached home in the midst of a terrific rainstorm, wet through to the skin and considerably shaken up. I left some echafolta solution to be used locally, advised hot moist dressings and departed. Imagine my surprise, when the next issue of the local paper came out, to see that my doctor patient was in bed suffering from a broken jaw resulting from the extraction of a wisdom tooth by a local dentist. I contradicted this report in the next issue, using no name, as mine had not been mentioned, and hushed the matter in this way as best I could; but it was several months before I had a patient come into my office to have a tooth extracted who did not tell me about that case of which he had read, and wondered what dentist it was. I never denied the fact that it was I who extracted the tooth for the doctor, and I took particular pains with each individual to explain the circumstances as just described. Shortly after this incident an old man, a neighbor of the doctor's, came in to have some seventeen teeth extracted, and to use his dialect exactly, I'll quote: "Say, you're the dentist that broke Doc's jaw, hain't

you?" Here I started to explain that the jaw was not broken, but he interrupted by continuing, "Well, I am golldarn glad of it; put it there," and he grabbed my hand, squeezed it and jumped into the chair. "Say, Doc, you go right ahead and take out all of mine, will you?" I afterward learned that the doctor had broken off an upper molar for him in the attempt to extract it, and caused him excruciating pain for which he'll never forgive him. I'll give the doctor the benefit of saying that he had no intention whatever of injuring my practice, as he has sent a good many my way. His item in the paper was simply to show how brave a hero he was to meet so many serious accidents in one day and still live, but this little episode clearly proves how easy it is to alarm the whole community by just a few injudiciously used words, and perhaps damage a practitioner's reputation.

Occasionally patients will come in for plates, and upon examination you find maybe two, usually only one tooth on either jaw, around which they wish you to build the plates. You try to demonstrate why such a plate would be impracticable, and why the teeth should be taken out, but it is very seldom that you will succeed in having them part with their old comrades. They know a plate of that sort is harder to construct, and seem to think that is just the reason you argue against it.

Sometimes a patient presents himself for examination, having been elsewhere for the same purpose not over ten minutes before. He distinctly remembers what the other dentist advocated and what his estimate for the work was. He sits down in your chair and acts as if he never saw one before. You examine carefully and your name is "robber" if you find one more cavity than the other dentist, or if your estimate is a dollar higher.

Occasionally a patient comes in knowing exactly what he wants to have done, although his teeth may not need or be adaptable for the work he has planned. Here again you are in trouble, for no amount of persuasion will change his ideas, and he will go to try his luck elsewhere and have it all done as he planned, where the dentist says "yes" to everything.

It is not in all cases that patients disagree on financial questions, oh, no! This patient may want two or three anterior superior teeth gold-crowned (thinks he'll look richer), when his teeth could be easily porcelain or gold-filled and the appearance made de-

cidedly more neat and esthetic. Should you refuse to do it he will keep on trying, for he is sure to find some dental parlor where they will be tickled to do it while he waits.

Sometimes a grouchy father will bring in his ten-year-old daughter whose teeth are in a sadly neglected condition. After he hears your opinion as to the work and learns the probable cost, he'll be apt to say as one of my patients did, "Well, no, I am not going to spend that on her teeth; they will have to be yanked out before long anyhow, and I'll tell you right here (pointing to his upper plate), I would give more for this plate than for all the teeth that I ever had filled." He evidently intends to have his daughter lose her teeth as quickly as possible so that she can have a plate at fifteen. In this particular case, however, the man is being fooled, for his wife is saving every penny, bent on having her daughter's teeth fixed properly, and, as we all know, when a woman determines to do a thing she'll do it at all hazards. Her husband is simply ignorant and stingy, as many of our patrons are.

I recall a case where a middle-aged man came into my office one day and handed me several fragments of an upper plate, telling me that he had had the misfortune to break his plate. It could not be repaired, so I advised a new plate. He insisted that I use the old teeth. Upon examining his mouth I soon saw that he had never worn the plate, and after pumping him for awhile I learned that the plate had belonged to his mother-in-law, who had died recently, and he thought he could make use of her at last by rebuilding her teeth for himself. Could anyone be meaner than that?

Only the other day it came to my knowledge that a young lady for whom I was working had left her home to work so as to earn enough money to repair her naturally beautiful teeth, as her father positively refused to give her any money to squander on her teeth, as he had never seen a filled tooth or one without a nerve that was worth anything.

Summing it all up, how are we to improve such conditions? What shall we do to better educate and enlighten the average community? Are the people always to blame? Oh, no! not by any means; dentists themselves are largely at fault. What would you do if you were informed by one tailor that the checkered stuff is up to date just now, and another just across the way told you

that plain goods were all the rage? You surely would say one or the other or perhaps both were lying. This may truly apply to us. I may advocate a Richmond crown for some tooth, while the dentist next door says by all means put on a gold one; one across the street says extract the tooth, and still another says he can devitalize and fill it. What is the poor patient to do? Here he has had four different opinions from four perhaps the best dentists in town inside of a little more than that many minutes. How are we to improve such deplorable conditions? Most of us are depending on our practice to maintain our existence, and we give advice according to our ability, and it may not always be to the best interest of our patient, which of course is decidedly wrong. If I am not good at making a bridge, but am fairly successful at partial platework, in all probability I should advise and even strongly argue for the partial plate, when I know full well that the bridge would be better. Where is the secret of such vast differences of opinions? It is true we come from all over the universe, but it is equally as true that the teachings of our dental colleges never vary to such an extent as to admit of vast discrepancies. The opinion as to what is the best for a certain case should not vary much, and our fees, especially in the same locality, should be as nearly as possible the same. When the patient realizes that several good dentists give similar advice and that their charges are nearly the same, we have accomplished a great deal toward his education.

In some towns I could mention the dentists hold occasional meetings and establish fees from which they depart even within a few days. Such actions are unpardonable, and serve not only to injure the profession as a whole, but certainly prove in time ruinous to the under-bidder. My motto is to charge fair fees for all that I do, and perform the work with painstaking accuracy. If there should come a piece of work that you cannot do properly, rather than advise something in substitution for the best, send your work to a good laboratory, and you will not cause any unjust injury to your patient. It is my belief that patients should receive a short but concise explanation as to what their work ought to be, and how and why certain steps are necessary to so complete it. It is almost daily that I show a little chart of Dr. Bannister's,

which no doubt most of you have seen. This little diagram shows the roots of the teeth and their respective nerves; it takes but a minute (and none of us is so busy that we cannot stop a minute to explain), and the patients see for themselves and understand more clearly what is to be done and they are more satisfied. I say, we owe it to them; the teeth are theirs and they should be consulted and educated. No conscientious surgeon ever performed an operation without first explaining to either the patient or his next of kin why it should be done, and in a few words, using no technical terms, telling how same was to be accomplished. How much easier this explanation can be made by us dentists when we have charts, drawings, photographs and plaster models of teeth with cavities prepared in them or even by samples of finished work. Patients as a rule absorb all this and feel more friendly and are decidedly more composed. It is not true that dental knowledge on the part of the laity hurts the dentist in any way. The man who tries to make you believe it is for your interest that your patrons be kept in ignorance of all that pertains to their respective cases must have some other reason than the interest of the profession or the patient for what he says. If you scan the list of your patrons you will realize at once that the more intelligent they are the less trouble you have with them, and the more they appreciate your services. So we must labor with honesty of purpose; we must have energy, ambition and life in our work. "Dead men tell no tales," you all know the old proverb; brought down to date it might be made to read, "Dead men make no teeth." But there is such a thing in life as dying by inches without showing the common symptoms of decay; men sometimes totter to the grave unknowing themselves that their end is near. Nothing can be sadder than a case of this kind. Keep alive, put your whole soul into your work, and the day will be shorter whatever the task. No day is too long for honest effort, honestly put forth. We must educate our old patients as well as our new patients; our young and our aged patients. The day may come when our efforts will be realized by some future generation of dentists, and if it were possible for us to return then, no doubt we would be more than glad to continue the work of our lives, as we all love our profession and we all must love our fellow-men.

REPLANTATION, TRANSPLANTATION AND IMPLANTATION.

BY J. F. AUSTIN, D. D. S., GRAND RAPIDS, MICH. READ BEFORE THE SOUTHWESTERN MICHIGAN DENTAL SOCIETY, AT KALAMAZOO, APRIL 11-12, 1905.

Replantation, transplantation and implantation cover a subject that should receive a great deal more attention than it does. Replantation is an operation for the replacing of a tooth which has been accidentally dislodged, or, it may be, intentionally extracted for the purpose of cutting off the apex of the root for the cure of a chronic alveolar abscess, or the removal of some foreign body from the apex or end of root, such as a part of a broach or a mass of gutta-percha which has been forced through the apical foramen in filling the root canals.

A tooth when once out of its socket, even if replaced in a few minutes after its dislodgment, will never be other than a foreign body. However, if carefully sterilized and the canal properly filled, it will remain in place for a considerable period and give useful service, providing that it is securely immobilized.

Some writers hold to the idea that the peridental membrane becomes regenerated, but I hardly think this is true, for until there is a partial destruction of the root there can be no fixation of the fang, as it is by the solution of a part of the lime salts of the cementum that this condition is brought about.

The process of absorption takes place at points on the circumference of the root, probably through the agency of the osteoclasts, very similar to the process operating in the absorption of the roots of deciduous teeth. If the process of absorption be rapid the time the tooth will remain stable is very short, but if the process is slow its usefulness will be prolonged to a corresponding degree. In some instances there will be no absorption at all, and in such cases the tooth never becomes fixed, although it may have been thoroughly sterilized and immobilized by mechanical means. This may be owing to some condition of the root or because of maltreatment prior to its reinsertion.

I think it is always good practice to replace any tooth which has been accidentally removed, for we can count on its doing good

service under favorable circumstances for a number of years. Three years ago I replaced, after three or four days, two teeth that had been knocked out, and they are still in excellent condition. I have made a great many implantations with excellent success. About three months ago a lady came to my office with trouble in a superior bicuspid. I examined the tooth and found it had been treated, so asked the patient if some other practitioner had been treating it, and she said one had been for some time, but it continued to grow worse. The indications were that she had an alveolar abscess, so I proceeded to treat for that trouble, but after working with it for over three weeks I came to the conclusion that there was something wrong besides an abscess, so advised the patient to have the tooth extracted and let me make a replantation, to which she consented. I extracted the tooth and found my brother practitioner in opening up the root canals had accidentally opened through the root into the surrounding tissues, and instead of the broach passing up into the root canal, it had been forced through this opening into the tissues, causing a severe inflammation. I replaced the tooth as soon as possible, and a few days ago had an occasion to examine her mouth, when I found it apparently firm, with the surrounding tissues as healthy as any other part of the mouth.

To replant a tooth, first remove the clots of blood from socket as soon as possible after the tooth has been extracted, after which I always pack socket with some good antiseptic, preferably oil of cloves. This being done, scrape the root, take out the pulp, and fill the root canals. Then resect the end of the root and invest tooth in some good material for the filling. After the filling is in place remove the tooth, clean well and render aseptic by dropping it into a small dish of oil of cloves, letting it remain there until the socket is ready for its reception. I am very careful not to touch the tooth after this, always handling with sterilized pliers.

It may not be necessary to handle these cases with such care, but I remember a case at a clinic while I was in college, when my roommate and myself induced a very dear friend of ours to have an elongated central incisor replanted. Our instructor made the operation, and I remember he handled the tooth with his fingers entirely. He scraped the root with an old jack knife, and did not

sterilize the tooth at all. In three days the patient lost the tooth by suppuration, and we boys lost a dear friend.

I do not think we can handle these cases with too much care. After sterilization of both tooth and socket the tooth is forced into place and secured to adjoining teeth by a fine silver or copper wire. I have the patient come about twice a week to see that the wires are still secure, and also force oil of cloves underneath the free margin of the gum with an orange-wood stick. The tooth should be sufficiently fixed in from three to four weeks to dispense with the wire.

Transplantation is rarely desirable in these days of porcelain crowns and bridges. If the root has lost its utility as a carrier of a crown it may be extracted and a tooth from another mouth be put in its place. There are several difficulties in the way of transplantation: first, the disinclination of one to have the tooth of another person in his mouth; then the possible transmission of disease makes the operation more undesirable, and another objection is the difficulty of getting suitably-shaped teeth and properly-shaped roots to fit the socket, although if the root is not of suitable shape the socket or root can be modified to suit the case. However, if much of the root is cut away the chances of its permanency are materially decreased. The method of transplantation, with the exception of changing the root or socket, is the same as replantation.

Replantation and transplantation have been practiced for a long period of time, but implantation is comparatively new. The late Dr. Wm. M. Morrison of St. Louis was the first to practice implantation, and later Dr. Younger gave prominence to this operation. Implantation, as its name indicates, contemplates the taking of a tooth from another mouth and placing it in a socket in the process which has been made by cutting into the bone. Such teeth are put in place in the jaw when nature has failed to give the proper complement or when a tooth has been extracted and the socket has been filled by natural processes. The objection of carrying a tooth from one mouth to another holds in this case as in transplantation; the only advantages over transplantations are that the sockets can be shaped to the root, and that teeth implanted remain longer fixed in the jaw than either replanted or transplanted teeth, but the difference in this respect is only trifling,

and all go in time in exactly the same manner. Special instruments are adapted for this operation and are as follows: A bistoury, a spear-shaped drill, cross-cut fissure and round burs of various sizes, and large flamed-shaped burs. A cruciform incision is made in the gum over the site of the missing tooth, the four flaps of gum are dissected up, and with a spear-shaped drill the bone is drilled to the length of the root to be inserted, care being taken that the inclination of the shaft of the drill corresponds to that of the adjoining teeth. The socket is enlarged by the fissure burs to adapt to the root, cleared of blood and bone debris and the tooth inserted and retained by the method before described. The opening in the gums should be a trifle less than the size of the root, in order that the root may fit more closely and act as a barrier to the ingress of microorganisms and the secretions. During the process of making the socket the root should be occasionally inserted as a guide to the adaptation of the opening to the shape of the root. Implantation is done only in incisors, cuspids, and perhaps occasionally in bicuspids.

Discussion. *Dr. George W. Cook,* Chicago: This method seems to come and go as a question for discussion in dental societies and as a practice by our profession. It is a valuable procedure, and as the essayist has said, it deserves more attention from the general practitioner than it gets. Now and then some one makes a hobby of it for a time, but it could be used more frequently to advantage than it is. Why do these teeth fail after about so long? This is a question that needs answering, and if we knew the answer we could enter on its practice with more assurance of prolonging the existence of replanted teeth, and we should know when to undertake the operation and when to do something else. I have made a number of operations with the usual amount of success. In some necrotic and abscessed conditions it is a good practice, and I have also used it advantageously in pyorrhea cases.

Dr. C. R. Rowley, Niles: Once a woman came to me with a lower molar tooth which had been replanted and which had become so loose that she could pick it out and replace it with her fingers. She was very anxious to have it fixed so it would not hurt her gum, as the roots had become rough, so I amputated them and

replaced with hard black vulcanite. The patient was greatly pleased and wore the tooth for many years.

Dr. S. M. Fowler: I have heard of rubber necks, but this is the first time I ever heard of putting rubber roots on natural teeth. I don't like the idea of holding implanted teeth with wire ligatures; they should be securely and rigidly held in place by suitable splints, cemented to the adjoining teeth. It is a good subject to discuss and also a good one to practice occasionally.

Dr. George Zederbaum, Charlotte: Ten years ago, when in the navy, I extracted a lower molar for a shipmate and replanted it with no antiseptic precautions to speak of. I saw it seven years afterwards and it was doing good service and as firm as any teeth.

Dr. James Doyle: A patient came to my office several years ago and I noticed a tooth that was turned half way round in its socket. Upon inquiry I found that ten years before the patient had gone to a dentist to have a tooth extracted, and in his absence the office boy undertook the operation, with the result that he extracted this tooth by mistake and replanted it, but in doing so changed its position. The tooth was doing good service, but I undertook to replant a tooth in the same mouth and it was a dismal failure in two months.

Dr. T. G. Rix, Dowagiac: I have essayed these operations many times with both success and failure. Forty-three years ago I extracted a root on which I had placed a crown. After cleaning the root I replanted and it remained in good service for twenty-five years. I have tried it several times with more favorable prospects and failed. Twenty-three years ago a boy had his four incisors knocked out by a pump handle, and after they had been out six hours I replanted them. They are still in place, are of good color, and the gum condition is as good as it could be. I have transplanted some teeth, but never got a long service from any of them. I can't account for the difference in results.

Dr. Austin, closing discussion: It will be found necessary to stay the posterior teeth with metal splints cemented to the adjacent teeth. The anterior teeth can easily be made secure by silver wire ligatures, and I have sometimes used only the silk ligature. I have done this work only four years, which is not sufficiently long to advocate it, but in that time I have never lost a tooth.

SCIENCE OF NITROUS OXID ANESTHESIA.

BY L. A. MEYER, D. D. S., OCONOMOWOC, WIS. READ BEFORE THE WISCONSIN STATE DENTAL SOCIETY, AT MANITOWOC, 1904.

The record that nitrous oxid has made for itself since its introduction proves it to be the best and safest of all anesthetics and the one most suitable for minor operations in dental surgery. Its employment is being extended so rapidly, that a better knowledge of its properties and effects seems necessary to secure its full advantage, without incurring undue risk of accidents.

The discovery of nitrous oxid, with its valuable properties and benefits to mankind, and the credit of its origin and successful use, are divided among several, each of whom contributed his part toward the final result. Nitrous oxid gas, discovered by Priestly in 1776. Its exhilarating and analgesic effects, by Dr. Davy in 1800. Its full and practical use as a true anesthetic was first demonstrated by Dr. Horace Wells, December 11, 1844. This marks the beginning of anesthesia. Dr. Wells died in 1848, too early to realize the honors and blessings of a grateful humanity.

Chemically nitrous oxid is a transparent, colorless gas, of slightly sweetish taste, and faint but pleasant odor. Its chemical symbol is "N_2O," indicating that it is composed of two equivalents by volume of nitrogen to one of oxygen. Nitrous oxid is not a mixture of its two constituent gases, but a definite chemical compound, in which the properties of the original gases are lost and a new one peculiar to itself is developed. Proof of this is found in the fact that the gas has both taste and smell, while air, composed of the same elements, has neither.

The constituent elements of nitrous oxid, although the same as air, differ from each other, both in the proportion of their elements and in the character of their association. Thus, while nitrous oxid contains one-third oxygen to two-thirds nitrogen, atmospheric air is composed of one-fifth oxygen to four-fifths nitrogen. In addition to this, in nitrous oxid the elements are in chemical combination, whereas in air they are simply associated mechanically, forming a mixture. There is a law in chemistry that when elements combine to form a compound that compound has a nature

peculiar to itself, and may not in the least resemble the nature of the elements which compose it.

The physical properties of nitrous oxid differ widely from those of oxygen, as well as from those possessed by any mixture of oxygen and nitrogen, and its physiological effects are equally distinctive because of its being non-oxygenating. Prevention of oxidation of the blood, however, would not be sufficient to account for the specific stimulating effect upon certain nerve centers, manifested during its administration. Dr. J. W. White says "That nitrous oxid, when inhaled, acts, primarily, by a specific stimulating effect on the centers of enervation; and, secondarily, by preventing the oxygenation of the blood. Furthermore, that the inhalation, if continued, produces progressive depression of vital functions, which tend to death, in which the anesthesia, or temporary unconsciousness sought, is a more or less clearly defined step in a downward path, there is no doubt."

"Immunity from danger can at the best be assured only by an intelligent and watchful guard, and its administration should be suspended while yet the centers governing respiration and circulation are not too profoundly impressed."

The possibility of maintaining unconsciousness and insensibility to pain by a continued administration of nitrous oxid, with sufficient oxygen or air to overcome asphyxia, proves that a distinct step in advance has been made. Owing to the fact that certain nerve centers are more easily impressed by nitrous oxid than others, it is possible to maintain certain stages of anesthesia by taking advantage of the evanescent property of the gas. The induction can be regulated to keep pace with the elimination, and in this way certain stages, as analgesia or anesthesia, may be held indefinitely, without serious danger or harmful after-effects. To Dr. Frederick Hewitt of London belongs the credit of devising and publishing a method by which a definite amount of oxygen or air may be admitted with nitrous oxid, and satisfactory results obtained.

An agent suitable for general anesthesia must possess certain characteristics. It must be capable of inducing general insensibility to pain, and in surgical anesthesia it must hold in abeyance muscular power also. It must be possible of introduction into the

circulation, without great difficulty or marked unpleasantness or danger to the subject. Its physiological effect must not be so rapidly acquired, or be so intense as to interfere with the control of its effect by the administration. The elimination must be complete, and sufficiently rapid to allow of an early return to normal condition upon the discontinuance of the administration. Nitrous oxid fulfills these requirements more or less completely.

The more or less gradual occurrence of the effects produced by anesthesia has led to describing the effects as occurring in certain stages. Such division is more arbitrary in the cases of rapid agents than it is with slow ones. The following division, given by Dr. Frederick Hewitt, represents in a general way the sequel of events:

First. Stage of disordered consciousness.

Second. Stage of unconscious reflex activity.

Third. Stage of surgical anesthesia, or coma.

When anesthesia is complete sensation is wholly suspended, but consciousness may not be entirely so, and while there is suspension of muscular action, there is no general muscular relaxation.

Having made the statement that nitrous oxid possesses true anesthetic properties, let us consider its action when inhaled, exclusive of atmospheric air or oxygen gas. The facepiece, or inhaler, having been applied to the patient's face so as to cover nose and mouth, with prop in place, the patient is ordered to breathe naturally. If perfect confidence and quiet prevails, he will continue to do so until the system begins to respond to the natural stimulant of the respiratory centers; from a lack of oxygen, at this stage the respirations are increased and an exhilarating feeling is also possessed by the patient. The administration being continued, the patient's mind will next lapse into a state of disordered consciousness from the effects of the gas, and from its secondary effect of deoxygenation of the blood. In rapid succession will follow the second stage of unconscious reflexes, such as the corneal, and finally the surgical period of anesthesia or coma. This state is usually recognized by snoring, as in sleep. The patient presents rather an alarming cyanosed condition. In the event of failure of

the unconscious reflexes to respond to the usual irritation at the third stage, the administration should be withdrawn.

The duration of anesthesia, or time for operating, will usually be from thirty seconds to one minute. Patient will usually recover without any bad after-effects, unless previously much exhausted.

The foregoing administration may be modified to advantage by permitting alternately a few inhalations of air, especially just before the third stage of narcosis, so as to avoid any asphyxiation symptoms. This method produces a slower anesthesia, but a more lasting one by several seconds. This practice has been recommended by Dr. Frederick Hewitt of London, to administer a small percentage of oxygen gas concurrently with the nitrous oxid, thereby producing a slower anesthesia and avoiding in a degree the asphyxiating symptoms usually accompanying the administration of nitrous oxid alone. This method also produces a trifle longer state of narcosis, from fifty seconds to one and one-half minutes. It is not good practice to readminister nitrous oxid until patient has fully recovered, when a second or third administration may be made. In this the judgment of the operator must decide.

The experiments of Dr. Frederick Hewitt and others with nitrous oxid, in combination with air or oxygen, have aroused the inventive genius of individuals and manufacturers to perfect and place upon the market apparatus for this purpose. It is true, there are many of the apparatus which have been very scientifically designed for the use of nitrous oxid with certain percentages of air or oxygen, to produce prolonged and nonasphyxial anesthesia. I am of the opinion that no matter how mechanically perfect the apparatus may be, there must be the anesthetist whose duty it is to regulate the induction of gas or percentage of mixtures, so as to comply with the symptomatic condition of the patient. Personally, I am using the nasal inhaler when applicable, giving nitrous oxid with indefinite quantities of air or oxygen when necessary to avoid asphyxiating symptoms, or to make use of the recuperative properties of pure oxygen gas in this form of narcosis.

To regulate the supply of nitrous oxid during an administration I would suggest that the gas be allowed to assume its gaseous state by allowing it to flow from the supply cylinder into a reservoir or gasometer. The gas collected in the reservoir is under considerable pressure. This pressure insures a steady supply of gas

through a perfect air-regulating valve. When administering, it is quite essential that the gas be led to the patient under varying degrees of pressure. *First.* To insure the supply of gas. *Second.* So as not to disturb the respiratory function, from a lack of something to breathe. *Third.* To force the predominance of nitrous oxid gas over other concurrent gases in circulation. *Fourth.* To force the diffusion of nitrous oxid in the lungs, insuring rapid absorption by the blood and the effects of nitrous oxid on the nervous centers producing narcosis. It is possible, by carefully regulating the induction of nitrous oxid with an indefinite current of air or varying per cent of oxygen gas, to maintain a state of partial or complete anesthesia for an indefinite time, or long enough to perform any reasonable dental operation.

DISCUSSION. *Dr. J. S. Danforth,* Sheboygan: Did I understand that you were using an outfit by which you gave an indefinite amount of air, and do you continue giving air from the beginning?

Dr. Meyer: No.

Dr. R. E. Maercklein, Milwaukee: This paper brings a difficult question to my mind. I have seen some clinics of the kind, and they were not very successful, and, furthermore, I know of several cases where they were using nothing but gas, yet under these circumstances there was more excitement, often becoming so great as to make it almost impossible to hold the patient. Now, I do not see why it should work in one case and not in another.

Dr. Meyer: I tried to convey the idea that the condition of the patient must be quiet and tranquil. The induction of gas must be regulated to suit each patient, for there are no two alike. Many operators are overanxious to get their patient under the influence of the anesthetic, but the longer it takes the more satisfactory will be the results. Having practiced according to both the old and new methods, my preference is decidedly with the latter.

Dr. G. C. Marlow, Lancaster: I have used gas in my practice and favor it. The oxygen attachment I have not used to any extent, but believe it to be the proper method in a great many cases. To insure the great essential, quiet, I usually close all windows and instruct those persons who may be around the office to refrain from making noises, also cautioning the patient along the same line. A

great deal depends upon the apparatus, and the operator will do well to always make sure that every part and attachment is in proper working order.

Dr. P. B. Wright, Milwaukee: Having given up the use of gas, since it hardly pays in a city practice, I take my patients to an extraction specialist and usually stay with them during the operation. From having watched the specialist on many occasions, I think the excitability of many patients is largely a question of temperament. It is my idea that the quicker they are rendered unconscious the better will be the results. Should you wish to prolong the anesthesia the anesthetic may be crowded at the start and you will thus run the different stages together, rather than prolong the anesthesia by the admission of air.

Dr. Meyer: A continuous flow of gas must be kept up, and if any alarming symptoms are noted cut the gas off immediately. One thing I wish to impress upon you is the physical action and effects of the different gases under pressure, and this is what I have tried to deal with, rather than apparatus. I have several of the latter in my office, which are used for small operations; where, however, you have an operation that calls for anesthesia lasting for possibly twenty minutes, you cannot obtain this result by the old-time apparatus and therefore must have recourse to one of the new methods described.

Dr. F. G. Van Stratum, Hurley: I would like to ask why Dr. Meyer allows his patients to come out of the influence of the gas before administering it a second or third time, where necessary.

Dr. Meyer: I have given it immediately upon my patient's recovery, but if it is a piece of tooth that must come out the mouth must be placed in good condition before resuming the anesthetic. Otherwise I go right on.

HEMOPHILIA.—Grant reports the case of a hemophiliac, a boy, suffering from hemorrhage from a cut on the foot, in which the bleeding was checked apparently only by the use of ovarian extract, adrenalin and other hemostatics having proved useless. The treatment was based on the fact that women are rarely hemophiliac, and it is suggested that this female immunity is due to some constitutional influence emanating from the female reproductive center, an internal ovarian secretion. In the case here reported two and a half grains of ovarian extract obtained from sheep were given thrice daily.—***New York Med. Jour.***

Digests.

GRAPHIC RECORDS OF MOVEMENTS OF THE MANDIBLE IN THE LIVING SUBJECT AND THEIR BEARING ON THE MECHANISM OF THE JOINT AND THE CONSTRUCTION OF ARTICULATORS. By George G. Campion, L.D.S., Manchester, Eng. Read before the Fourth International Dental Congress, St. Louis, 1904. The problem of the exact elucidation of the movements of the mandible must be of interest to all dentists who are trying to achieve success in the construction of an

FIG. 1.

anatomical articulator. The method here described of following these movements, and the accompanying graphic records of actual movements in the living subject, may interest this Section.

Fig. 1 shows in position an instrument consisting of a small tray, shaped like a lower impression tray but without a handle, to the anterior border of which are fixed two brass rods. These issue from the mouth and are bent upward and outward to conform approximately to the contour of the cheeks. To each of them is fixed a plane surface of brass, the two surfaces on opposite sides of the face being arranged parallel to one another. On these slide

two other plane surfaces, the positions of which can readily be adjusted and fixed by thumb-screws. Each of these movable planes carries a brass tube which can readily be fixed in a position exactly over the corresponding condyle after its position has been ascer-

FIG 2

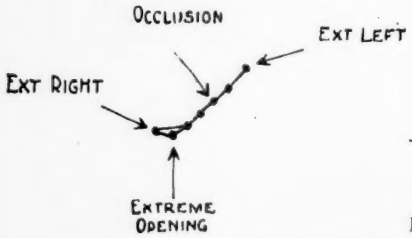
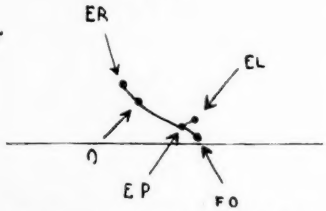


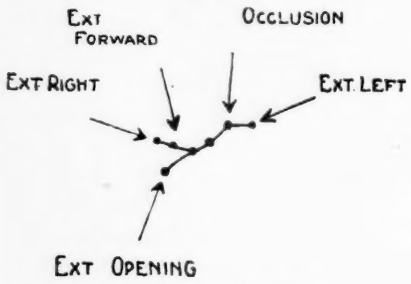
FIG 3



Right condyle Path nearly straight.

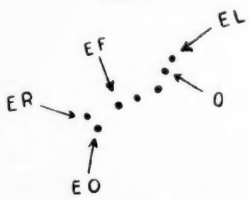
tained by palpation. By getting the patient to move the mandible from side to side the positions of the condyles can be determined with ease and the tubes fixed exactly over them. When the tubes have been thus adjusted they project from the sides of the face perpendicularly to the skin covering the condyles. A pointed piece of brass rod slides easily but accurately in the tube, and after the

FIG. 4.



Left condyle. Path sigmoid.

FIG. 5.

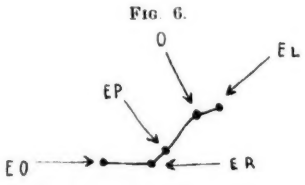


Left condyle Path irregular.

instrument has been fixed rigidly to the lower teeth by modeling composition and the tubes accurately adjusted, the point of the sliding brass rod being charged with some coloring matter which does not readily dry (such as rouge mixed with oil to a creamy consistency), the varying positions of the condyles can be readily indicated by a succession of dots on the skin. A piece of white

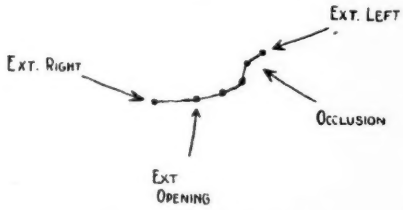
blotting-paper is then gently pressed over them, and from this the record can be easily transferred to paper or a ground-glass lantern slide. By using a piece of blotting-paper about three inches long by one inch broad, with a penciled line drawn along the middle of one surface from end to end, it is easy to record the relation of the condyle path to an imaginary line from the external auditory

FIG. 6.



Left condyle. Path sigmoid

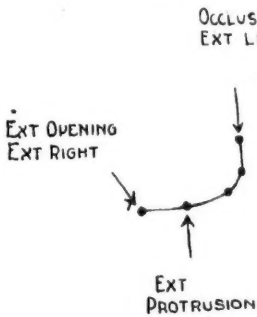
FIG. 7.



Left condyle. Path sigmoid.

meatus to the lower border of the nose, and thus show approximately the relative slope of the condyle path in different individuals. The positions recorded explain themselves when it is stated that in those of extreme protrusion and extreme right and left the teeth were as nearly closed as the apparatus would permit.

FIG. 8.

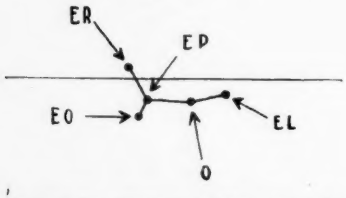


Left condyle. Path markedly convex downward.

The accompanying records of actual condyle paths in different individuals show wide variations—an almost straight line, sigmoid curves of differing lengths and curvature, and curves of unequal convexity. The slope of the condyle path also varies greatly, being

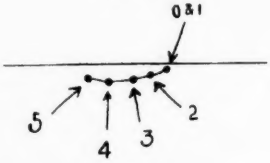
usually downward and forward, but often nearly horizontal, in one case of those shown being forward and actually upward. Now, these variations in a number of unselected cases show at a glance how futile must be any efforts to construct an anatomical articulator on the lines of Bonwill, Walker, Schwartz, Christensen and Grit-

FIG. 9.



Left condyle. Path markedly convex downward, but the sliding movement is forward and upward. This was associated with great attrition on all the teeth.

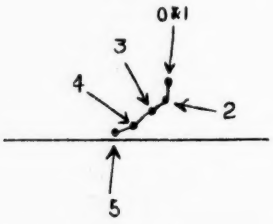
FIG. 10.



Left condyle.

man, and that no articulator can be in any real sense "anatomical" in which the condyle paths are not capable of being specially arranged and adjusted for each individual case. To Mr. J. B. Parfit of Reading, Eng., belongs, I believe, the credit of being the first to construct an articulator which embodies this essential point.

FIG. 11.



Left condyle.

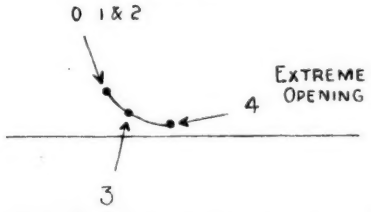
FIGS. 10 AND 11. Showing relative positions of condyle—at occlusion, and with mouth opened to extent of 1, 2, 3, 4, and 5 centimeters respectively.

Three other slides represent the positions of the condyle in occlusion and when opened successively to the extent of one, two, three, four, and five centimeters—except, indeed, where the mouth could not be opened to this full extent. In obtaining these three tracings

care was taken that in closing on the pieces of metal of these different measurements the mandible was not in any way protruded, but was held back as far as possible in the position which obtains in occlusion. It will be noticed in these tracings that the position of the condyle in occlusion coincides exactly in two cases with its position where the amount of opening is one centimeter, and in the third case with the position where the opening has been to the extent of two centimeters.

It has been suggested that in the movement of opening the mouth the mandible rotates about an axis situated about one and a half inches below the two condyles, and that an articulator should be so arranged that its hinge should be placed in approximately a corresponding relation to the teeth of the case under treatment. From

FIG. 12.



Right condyle. Relative positions of condyle—at occlusion, and with mouth open 1, 2, 3, and 4 centimeters respectively.

the various curves shown it would seem that both these conclusions are erroneous, and that there is and can be no one axis about which the mandible moves in opening the mouth, but that the movement is a complex one, consisting first of a rotation of the bone on an axis passing approximately through the centers of the two condyles, and secondly, of a forward and downward movement of the condyles as they slide over or with the meniscus-shaped interarticular cartilage along the curve of the eminentia articularis. The actual movement would seem to be a complex one, consisting approximately of more or less simultaneous rotation about two axes, one passing through the centers of the curves of the articular surfaces of the two condyles, the other through the centers of the curves of the two eminentiæ articulares. It will also be clear that if in opening the mouth to the extent of one centimeter the move-

ment is one of rotation about an axis passing through the two condyles, then in adjusting models to an articulator they must be so arranged that the hinge of the articulator will be in the same relation to the teeth or alveolar processes as the centers of the condyles are in the living subject. The only part *of the opening movement* which an articulator is concerned to reproduce is the initial stage, which is seen in the tracings to be a simple rotation about an axis passing through the condyles.—*Cosmos.*

RETAINING APPLIANCES. By H. S. Vaughn, D.D.S., Kansas City, Missouri. Perhaps the greatest bugaboo of the dental profession is the retention of orthodontic corrections. This would not be the case if there were not so much difference in the conditions of such cases, which makes a universal rule for retention impracticable. There are but few who have the opportunity of seeing cases corrected in their attendance at college, and if they do have this opportunity it is possibly one case, and that a very simple one. So to most operators the knowledge they get along the line of orthodontia comes after they have left college.

Most men have the idea that they have completed a correction when they have put the teeth in proper position. Here they stop, and here they fail. Almost any blacksmith can do this much. I say they have only begun, for by far the most difficult part of the operation is keeping the teeth where you have put them when corrected. I give as much or more care to this part of the operation than to any other. Many patients, and even sometimes dentists, will say, "Oh, you can perhaps straighten the teeth, but you can't keep them there. They will return to their former positions." They very likely will for such dentists as these, but not for all. Now if you can't do this sort of work and make it permanent, quit it, and don't discourage its being done, but be honest about it, say you can't do it, but know some one who can, and send the case to your neighbor. The patient will respect you for your honesty.

There may not be one thing herein you have not already seen in print, or heard talked at some association, yet a review of things we already know sometimes does us good. The principal feature in a retaining appliance must be *firmness.* No slipping or springing appliances will ever enable the teeth to become fastened. In fact, they but cause the teeth the longer to remain loose, thereby length-

ening the time necessary for the retaining appliance to be worn.

The sooner a tooth can be moved into place—within reason—and securely retained, the sooner it will become fast in its socket. The reason for this is simple, as you will see. Suppose, for example, you push a central incisor from within the arch into position, and place a firm retaining appliance on, it will tighten quickly. But an appliance which moves up and down, sometimes pushing the tooth out and again in, will cause the alveolar process to be absorbed on both sides, removing the support on the outside of the tooth that it should have had, which leaves the tooth resting only on the

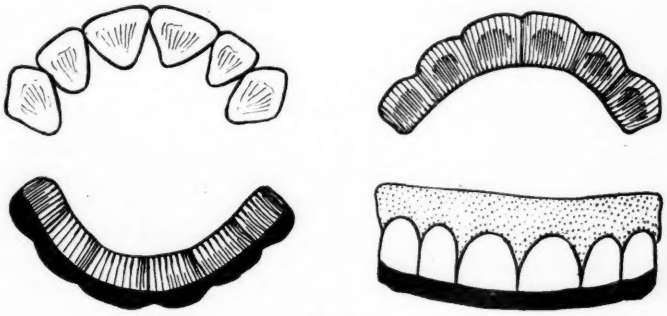


FIG. 1.

Fig 1 represents anterior teeth, swaged German silver appliance with labial extension, and appliance in place on the teeth.

end of its root in the socket. This compels you to make a much firmer retaining appliance, and necessitates the patient's wearing it about twice as long again, or the tooth will easily return to its former position. In ordinary cases, where the teeth have been moved slowly, the osteoblasts will rebuild the alveolus behind the moving tooth almost as rapidly as it was resorbed before.

Now, would you like to know how to make this permanent retention? Well, it is not an easy task, and since each case differs so widely from every other it will be impossible for me to attempt to describe them all, or lay down any ironclad rules, though I will make an attempt at two or three cases of the most ordinary kind. This little bit of advice first: Don't be afraid of marring your patient's looks for the time being, if you can benefit them for eternity.

I have an idea that the reason why many of the profession charge

so little for this sort of work is, they are in doubt whether they will benefit their patients—which it is likely they won't. If you can retain the teeth where you have put them by covering every tooth with an unsightly substance, I say, do it, no matter what comments are made by patient or friends, if by so doing you can make them stay, for if you fail to complete your correction you will be criticised but the more. Whenever I can save my patient's looks by concealing the appliance I do it, provided it does not interfere with the accomplishment of my purposes.

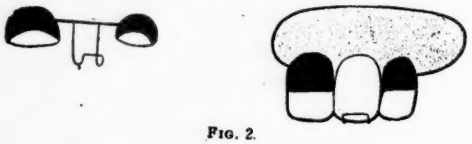


FIG. 2.

Generally speaking, the six anterior teeth are the most difficult to hold in place after correction, and are by all means the most important to have look well. For the retention of these I usually take impression, make a die of the six teeth, swage over the back of these a piece of very thin German silver strip, which I reinforce with soft solder to prevent its giving. The portion extending over the labial surface is trimmed until only a very small portion extends over the cutting edge so as to hold. Should the bite be very close the appliance could not extend on the lingual side, but would have

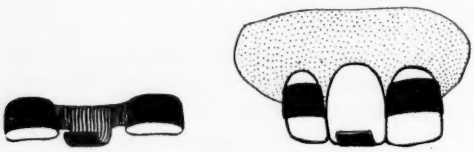


FIG. 3.

to be made for the labial surface, and extend very slightly over cutting edge lingually. After the appliance, thus made, is gold-plated, place it on the teeth with cement, and hold firmly until it has thoroughly set, then remove all excess of cement. (See Fig. 1.) Whether these teeth have been moved outward or inward makes little difference. They can usually be held in position by this means.

Should the correction be only a single tooth the appliance could

of course be made much simpler, more like the device recommended by Dr. J. K. Douglas in the November *Summary*, 1903, for holding replanted teeth in position, as shown in Fig. 2. I would prefer, however, to have a piece of German silver backing in the place of the wire he suggests, and solder it to the bands, as shown in Fig. 3.

A very simple way of holding one tooth in place is by banding the straightened tooth, soldering to the band on the labial side a German silver wire which has been bent to fit the surfaces of the

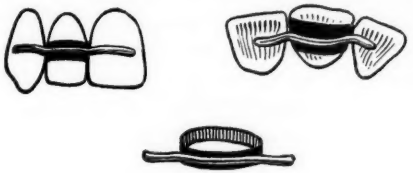


FIG. 4.

teeth on either side. (Fig. 4.) Cement the band on when completed. This can be easily worn, as well as kept clean. Leave this on until the tooth is thoroughly tight. I am not much in favor of banding teeth for retention though, for the separation made by the bands between the teeth often remains after their removal.

The so-called retaining appliance is not always practical, for in many cases the appliance which was used to correct the irregularity is by far the most useful and practical retainer, provided it

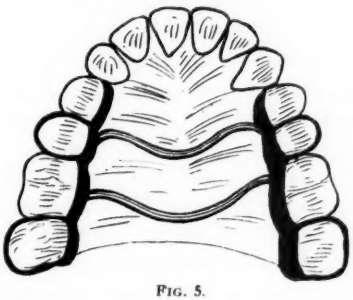


FIG. 5.

can be kept clean. In a case of expansion of the arch, where the "Jackson Crib" is used (Fig. 5), nothing to my mind could be more efficient for such a case as this than is the appliance used for the correction.

In some cases a rubber plate, covering the roof of the mouth, is very good where there has been an expansion of the arch or front teeth pushed outward. Some people cannot stand rubber in the mouth, while on the other hand, some other form of appliance may be equally as objectionable. Therefore great care must be exerted in the selection of a retaining substance. Lay down no universal rules for the retention of teeth, else you make a sad mistake, for often the form of appliance that appeals to you from a mechanical standpoint will be an utter failure from a practical point of view.

Strive on until you devise some plan which will retain the teeth in the place you would have them, not resting until you have accomplished your undertaking. Often you will find the simplest device will do best what you have worried over to accomplish. Make appliance firm. Securely fasten it. Make it as simple as possible, that it may be easily cleaned. Leave it on too long rather than too short a time. Don't stop until you have accomplished all this, and you will surely make a success of your correction.—*Summary.*

DIAGNOSIS IN ORTHODONTIA. By Varney E. Barnes, D.D.S., Cleveland. Read before the Cleveland Dental Society. My object in selecting this particular subject is to stir up thought along a line which has been sadly neglected by the dental profession in general, and by many claiming to make a special study of malocclusion, and to present facts that have been overlooked, and perhaps some that are new to the average practitioner. Comparatively little has been written that will aid in diagnosis, and the little is contradictory. The great majority of our dentists know nothing about diagnosis, and as a result we have delayed correction of irregularities, or far worse, the wholesale extraction of sound teeth to "make room." The literature of the past and present is teeming with illustrations of obsolete appliances, designed to close up spaces after extracting, and with papers and cuts of models, telling when to extract and showing the results of such barbarous treatment. Throughout the country our dental colleges are teaching, with but few exceptions, regulation by means of extraction. What is the cause of this? *Simply improper diagnosis.* In the past the diagnosis has been made to fit the apparatus at hand, but the present has no such excuse, for we have appliances that are capable of correcting all cases susceptible of correction.

To correctly diagnose a case in orthodontia takes some time, and requires a thorough knowledge of the occlusion and eruption of the teeth, as well as a special study of both patient and models of his teeth. Let us always keep in mind the fact that we are working upon flesh and blood and nerves and not upon unfeeling dummies. On the first presentation of a case your diagnosis must of necessity be hasty and superficial, and therefore almost certainly incorrect in some respect. Moreover, an inspection of the teeth in the mouth does not give all the views of the occlusion. Consequently our first work is the taking of an impression. First, the teeth are cleaned and the mouth thoroughly sprayed with an antiseptic solution. This gives cleanliness, a sharp impression, and both patient and operator gain their first confidence in each other. Without the confidence of his patient the dentist might as well not begin to regulate at all, but with it he can accomplish wonders with some of the most unfavorable cases.

Mouth-breathing, enlarged tonsils and tendency to gagging should receive consideration in taking the impression, which should be of plaster of Paris. Before the plaster is inserted into the mouth the patient should be informed what to expect, in order that he may not be frightened. Do not promise anything you cannot do, and keep your promises. Properly taken, a plaster impression is the *only* one that can be relied upon to give accurate results. A compound impression *will* pull and draw, obliterating lines and surfaces that are absolutely essential to a correct diagnosis. The only place where a compound impression is of value is in the mouths of patients under six years of age, where no surfaces are undercut, and even here plaster is often more agreeable to these little ones.

During this cleaning and impression-taking the operator should be making as complete a diagnosis as possible by questioning patient and parents and through observation. Note occlusion, features, eruptions and condition of teeth, age, physical condition, temperament, character and inherited tendencies of the patient. Radiographs may then be made if necessary. The patient may now be dismissed for a week, during which time the models are completed, and the parents have time to look up family characteristics that may have been forgotten or unknown.

The final diagnosis is made when the patient returns. The models are at hand, as are also the facts that are to be considered

in reaching a decision. Compare the models, tooth by tooth, with the natural teeth. Locate the occlusion and indicate it on the models by vertical pencil lines dropped from the mesio-buccal cusps of the first upper molars to the teeth beneath. In the case of the temporary teeth this line is drawn from the second molars. We can now use the models to see the actual irregularity in the mouth, and at the same time see the features in their condition of distortion due to that irregularity. In the study of the models the first thing to be observed is the position of the first permanent molars—the first of the permanent teeth to erupt, and the teeth on which occlusion of the permanent teeth depends. If *these fundamental teeth* are in proper position in the dental arches whatever irregularity there is will be slight compared to that in which these teeth are malposed. Dental irregularities *should not be classified* according to the *facial irregularity produced,* but according to the *occlusion of the teeth.* Malocclusion of the teeth may produce inharmony of feature. Correction of that malocclusion will restore facial harmony in all but the extreme cases where there is a strong facial characteristic, and the writer questions the advisability of attempting to overcome this, excepting possibly in the most marked deformities.

After noting the first molars the other teeth may be observed in turn, particular pains being paid to the inclinations. Here is where the accurate plaster model is of great value, for this condition has to be borne in mind all through the operation, and constant reference is made to the model. Some inclinations are so great that a perfect result cannot be obtained. The location of a lateral root beneath a cuspid, shown by X-ray, the lingual eruption of a cuspid and a rotated molar, etc., are instances of hard work ahead with imperfect results at best. Almost all cases of malocclusion reveal the necessity for spreading the arches, lack of development of the alveolar process being the accompaniment of nearly every one. Rare indeed is the case in which irregularity is not present in both jaws, for the least displacement of a single tooth means that much displacement for all the teeth in that jaw, and one jaw depends upon the other. With this study of each tooth and of all the teeth in occlusion as presented in the models, we make a partial diagnosis which is made complete by the consideration of the several conditions mentioned previously.

Physical Condition.—This being good other conditions may be

overcome, but if it be poor no operation should be commenced until there is evidence of a reasonable certainty that the faulty occlusion is to blame. If occlusion is the cause the sooner the teeth are occluded properly the better. Physical condition being poor the cause should be ascertained, and unless it is remedied no operation should be advised. Too rapid growth, confinement indoors, overstudiousness, malnutrition, nervousness, adenoid growths, enlarged tonsils, and the approaching menses in the female, are causes of ill health that may be detected. The approaching menstrual period in girls, from eleven to fourteen years of age, should receive the most careful consideration, and may be ascertained by questioning the mother. No operation is justifiable at this time unless the girl is strong and unirritated. There are many who pay no attention to this, but the writer believes they are in error, for at this time many young lives are wrecked by undertaking too much, especially in school work and music. Mothers themselves do not seem to realize the careful supervision that is necessary. Shall we add to the burden, when a little delay will give us a better patient unlikely to suffer a breakdown in health?

Anemic patients are the poorest subjects and in some cases are not to be operated upon unless willing and eager for it, understanding that it will be painful, tedious and rather uncertain as to result. A sufficient diagnosis of this condition will be the slow healing of wounds, pallor of the skin, and often a mere inquiry of the parents will bring the reply that the patient is under treatment for anemia. Nervous patients are generally poor subjects, but with their confidence and careful work they may do as well as the best. Adenoid growths are found in the cases of mouth-breathers and must be removed before regulation or there will be too great a tendency to return to the abnormal condition. Overstudy and confinement indoors are conditions that must be changed to get the best results.

Age of Patient.—Diagnosis of malocclusion may be made as early as three years of age in the most marked cases. Contrary to the general supposition, irregularities are frequent in the temporary teeth, and such cases properly diagnosed and treated before the permanent teeth erupt will prevent malocclusion of the latter. Between three and four years the normal temporary arch should show a separation between the incisors and cuspids. This separation

gradually widens to allow the eruption of the permanent incisors. Without this operation there is bound to be irregularity.

Sufficient data is not at hand at present, but there is a great deal of evidence to show that cases of mesial or distal occlusion (taking the lower jaw in relation to the upper) present the irregularity in the temporary teeth, and on the eruption of the permanent this is magnified. Correction in the temporary permits the eruption normally in the permanent. The earlier correction can be undertaken the easier it is; the older the patient the more difficult, and in many subjects eleven or twelve years is too late to obtain perfect results. However, forty years is not too old to undertake some types of cases, although the results that may be obtained do not begin to compare with those in younger patients.

Eruptions.—Premature and tardy eruptions of the permanent teeth require close attention. The X-ray is of great value in finding missing teeth as well as supernumeraries. Decay of the temporary teeth or their premature or tardy loss may delay the eruption of the permanent on account of lack of pressure which prevents normal growth in the jaws. The entire absence of teeth is one of the most serious conditions to be met, and it is only since the advent of the X-ray that it has assumed its serious proportions. In some few cases the spaces may be closed up, but most of these cases require the insertion of an artificial substitute which, however, should not be inserted until the patient is at least eighteen or twenty years old. This is at best an evil, but let us remember that our problem is to do the *greatest good* to the *largest number of teeth* for the *longest time.* Perfect occlusion is the greatest factor in the cause of sound teeth; if an artificial substitute will give this it is good; if not it is bad and must not be used. This problem must be solved in each case, for no general rule will hold. Decayed permanent teeth, as well as defectively formed ones, are often a source of irregularity.

Large Fillings.—Large fillings close to the pulp must be observed, for these are the cases in which the pulps are apt to die during movement. All cavities are to be noted and must be filled before regulation is begun.

Habits.—Finger, tongue and cheek-sucking, as well as mouth-breathing, are habits that the diagnosis should reveal. They will, if persisted in, cause irritation when the appliances are in place, and have a slight tendency to counteract the correction, but are not

responsible for as much deformity as they are generally credited with.

Heredity.—Inherited types and tendencies must always be revealed by the diagnosis. Make the closest search possible, seeing the relatives and asking questions that will settle beyond all doubt whether inherited tendencies are present, and to what extent. Some of these tendencies will be *so* strong that perfect results can never be obtained, although there may be improvement. Other cases, begun early enough, may come very close to perfection. All inherited cases are harder to correct, but they are the ones which appear in the very young and are easy to diagnose.

The future may hold much for us in the interpretation of the X-ray. The collection of models of very young subjects is sure to teach us much that is to-day unknown or at best uncertain. Let us for the present aim high. Let us study harmony of feature and normal occlusion and base our diagnosis upon this, then what we learn in our close study of the patient and models will enable us to foresee the exact results of the operation. Extraction in the correction of malocclusion, whether through haste, ignorance, lack of time or financial reasons, must soon be classified as malpractice, where it belongs and where it is placed by the foremost orthodontists of to-day.—*Summary.*

SOME PATHOLOGICAL PHASES OF ALVEOLAR ABSCESSES. By George W. Cook, B.S., D.D.S., Chicago. Read before the Chicago Odontological Society. When vascular tissue becomes inhabited by bacteria that are active, there are always two processes that make themselves manifest if viewed with the microscope—there is either cellular degeneration or regeneration. The regenerative processes which occur in close proximity to an infected area must necessarily depend upon a number of phenomena that are characterized in living tissue—first, the functional activity of the cells themselves, and, second, the inherited or acquired immunity of that particular tissue to a certain microorganism. Degeneration may be the result of two possible factors. The first and most important of these is caused by the species and virulence of the organism present. The second is the predisposition of the tissues to undergo retrogressive changes in the presence of certain toxic agents.

The term "infection" is looked upon as meaning the successful

invasion of a microorganism to endure the defensive mechanism of the tissue. This must depend upon the virulence of the microorganism or the toxicity of its products, and the amount of injury the tissue has received at the time of microbic invasion. As has already been said, the tissues are normally of a reparative nature, but sometimes may be inclined to degenerate.

Up to the present time there seems not to have been found a specific bacterium that produces the phenomena usually designated as inflammation and suppuration. However, there are a number of bacteria, either singly or together, that produce these various phenomena and are sometimes called specific pyogenic germs. These organisms are usually looked upon as those that are constantly present on the surface of the body or in close contact with its external openings, and under almost all circumstances when the continuity of the tissue is interfered with infection by the specific germ takes place. The reactivity of the tissue is determined by the virulence of the bacteria at the time they enter the tissue.

At the present time it is difficult to give a brief and comprehensive classification of these microorganisms, especially those that take part in the disorganization of the functional activity of protoplasm as represented in the multicellular form of animal life. In some instances we recognize that bacteria bear only a casual relation to some disease processes, while in other cases bacteria might be considered as the true and only cause of the disease. The question would then naturally arise: How do organisms act upon tissue substances? In such well defined systemic diseases as anthrax, typhoid fever and cholera, it is apparent that the specific toxins are taken into the general circulation and by this means influence every part of the body in a detrimental way. In the local infections the first degenerative action of the poison is confined in a particular locality where the infection is first established, and the tissue immediately begins a defensive action against the organism that carries with it a poisonous product that is capable of interfering with the life processes of the protoplasm of the cell. When these poisonous bacterial products are permitted to penetrate into the tissues they may be in such small quantities and become so dilute, in combining with a serous substance that surrounds the protoplasm of the cells of the body, that they may exert no very deleterious effect on the protoplasm of the tissue cells.

Mild irritation sometimes acts as a cell stimulus, in fact, it may be said that in nearly all instances where irritation takes place in the tissues there is evidence that proliferation of the cells takes place more rapidly than it does under normal circumstances. Virchow was the first to point out these karyokinetic figures in the nucleus of the cell in certain inflamed tissue, and at that time he considered that the increased cellular division was due to hypernutrition; but Cohnheim made further observations and concluded that the cells transmigrated from the blood vessels into the tissue and that the changes in the tissue cells were really a secondary phenomenon. Virchow's idea originally was that the increased number of cells was due to indirect cell division, while as a matter of fact the first and most important change in tissue, where a toxic or a mechanical agent has formed a habitat, is that the leucocytes at once migrate through the walls of the arterioles and establish themselves in great numbers in the vicinity of the poisonous agent, and instead of there being a hypernutrition there is a malnutrition, which at once manifests itself by there being established a degeneration of the normal elements of tissue substance. When a sufficient number of leucocytes have gathered around the irritating agent there is to be found a definite and more or less circumscribed area in which degeneration of the infected tissue takes place. As has just been said, the rapidity of the number of leucocytes that may gather will depend upon the kind of irritation present, for it is a proven fact that no agent has the chemotactic properties of leucocytes as do bacteria and their cellular products. When inflammation is fully established, where its onset is brief in duration and destructive in character, it is usually designated as acute, and where the tissue changes are characterized by a progressive disturbance in the tissue elements and show no tendency to recover, this is ordinarily designated as chronic inflammation. There is a process, however, that is distinctly indefinable and not belonging to either of the above-named processes, and is usually spoken of as subacute inflammation. If any of these inflammatory processes makes its appearance in the connective tissue, which is the framework or supporting substance of the tissue elements, it is termed interstitial inflammation, while if the tissue changes are first established in the essential functional cells of an organ or tissue it is classed parenchymatous inflammation, and with our present histological knowledge of the peridental mem-

brane we must necessarily conclude that the first tissue elements which are disturbed in this tissue are the parenchyma cells.

When certain infective agents, like bacteria, have entered the tissue by way of the apical opening of the root of the tooth, the kind of tissue changes that take place in this particular locality will depend upon the infective character of the organism that enters the tissue, as well as the kind of physiological processes that the tissue has been called upon to perform previous to the entrance of the organism. When degeneration of the pulp tissue is the result of a putrefactive microorganism it has, under ordinary circumstances, brought about several chemical changes, resulting in a number of intermediate products, which in themselves, from their very chemical nature, exert more or less influence on both the interstitial and parenchymatous cells of the tissue surrounding the tooth, and long before the bacterial cells have entered the tissue they have prepared either a susceptibility for a display of their immediate action or the tissue has formed a bacterial lysin in sufficient quantities to destroy a large number of bacteria that may enter. If the entrance of the bacteria is only gradual the bacterial lysin has an opportunity of displaying its action, but if a larger number of bacteria than can be destroyed at once is thrust into the field there is immediately established all the characteristic phenomena of acute inflammation, which, as we have previously said, is characterized by the accumulation of a large number of leucocytes. This is followed by degenerative changes in the connective tissue elements, which are microscopically observed as round-cell infiltration, cellular exudation, purulent exudation and suppuration.

In the first instance, as has previously been said, we have the transmigration of leucocytes, and their number may be many or few, depending somewhat upon the virulence of the organism producing the irritation. If they accumulate in large numbers and have fully established a phagocytic tendency they will cause liquefaction of the tissue with complete cellular death (necrosis). The corpuscular exudates are characterized principally by polymorphonuclear leucocytes, and when these tissues are present in large numbers they have a distinctive ameboid movement, and usually escape through the vessel walls with the greatest of ease.

If it were possible to always interpret the phenomena of inflammation as manifested in tissue, like that found around the apical

end of the root of a tooth, in general it would be said that the inflammation was conservative in its tendencies, benign in disposition, and usually circumscribed because of the carefully protective mechanism of the tissue elements in that locality. The stage of inflammation usually designated as hyperemia always exerts a diluting and solvent action on the irritating substance, with a tendency to remove and scatter the poisonous products, and the leucocytes have established a phagocytic property which enables them to destroy the microorganisms present and dilute their products in a way to render them more or less harmless. Should the above means fail to get rid of the irritating agent a further invasion into the surrounding tissue takes place. Degeneration of the surrounding tissue of an infected area follows in the direction of least resistance, tending to physically and chemically establish an external opening whereby the products that have been formed by the degeneration of tissue may be able to empty themselves externally.

When destructive degeneration of tissue is established at the apical end of the root of the tooth, as has been previously stated, the severity of the infection will necessarily depend upon the virulence of the organisms present. In bacteriological cultivation, inoculation and microscopic examinations, of both the tissue and organism, I have found a great variety of different organisms present and tissue changes. From a histo-pathological standpoint, where the bacillus of pulp gangrene is present, there is shown a number of tissue changes that are almost always absent where the pyogenic, strictly speaking, germs are present.

The decomposition of the tooth pulp by the action of bacteria and the formation of an abscess is most commonly the result of infection with the bacillus of pulp gangrene, so named by Archovy. This organism exists most commonly in the oral cavity as a harmless bacterium, but takes on a saprophytic action when brought in contact with tissue where the life of the protoplasm has been destroyed; it then passes to the end of the root, and after remaining there for some little time takes upon itself sufficient virulent properties to produce degeneration of the tissue surrounding the apical end of the root, followed by pus formation. This organism, from a biological standpoint, acts very much as does the bacillus proteus vulgaris, an organism which was first described by Hauser as a saprophyte, is widely distributed in nature, and occasionally presents itself in various infections and pyogenic lesions.

The bacillus that causes pulp degeneration in so many instances will also, as has just been stated, produce acute inflammatory lesions, rapidly followed by a formation of pus, but in the majority of instances this organism produces only a mild and continuous action and there is established a chronic form of inflammation. In some instances the pathology of chronic inflammation is chiefly characterized by fibrosis, which is the formation of a fibro-connective tissue in which all the essential phenomena of acute inflammation, such as hyperemia, edema, cellular infiltration and suppuration are present, and a single hyperplasia of connective tissue may exist for months and even years before it becomes of sufficient importance to make itself symptomatically felt. In such tissue degeneration there appear only the large lymphocytes and certain forms of polymorphonuclear leucocytes. The lymphocytes are larger in size and possess cytoplasma free of granules, and from a careful microscopic study of the tissue one would suppose that the majority of these were derived from the fixed and some perhaps from the wandering connective tissue cells. Their phagocytic activity is said to be of importance in combating the irritating agent, and if it is the bacillus of pulp gangrene they will circumscribe its action to a small area at the end of the root, and the tissue surrounding the area becomes somewhat immunized to the further action of bacteria, unless a very pathogenic germ should be introduced or some chemical agent that would increase the oxygen in the vicinity of the tissue degeneration. It has been observed that many of these organisms, and especially the one above named, take on a decided facultative anaerobic action, but will, when the quantity of oxygen is increased, establish themselves as aerobic and somewhat more pathogenic. As an illustration: If a mildly abscessed tooth is opened and peroxid introduced there will be established an acute inflammation, with all of its characteristic symptomatic conditions, with but little destructive effect upon the bacteria present.

In these so-called chronic alveolar abscesses, where the bacteria have but little effect on the surrounding tissue and it has increased its powers of resistance, the bacteria will pass into what is usually designated as the resting stage, and the conditions will remain almost at a standstill until some treatment is instituted with a mild chemical irritant whereby cell proliferation is established to such an extent

as to cause the death of the bacteria; but if a chemical substance is brought in direct contact with the tissue, and the agent has a powerful irritating effect, it will disturb the protoplasmic function of the cells in such a way as to increase the destructive changes in the tissue by the bacteria present. On the other hand, if the agent is a mild stimulus it will increase the functional activity of the tissue cells, which will decrease the regenerative processes of bacteria, and in this way will bring about the reëstablishment of the healthy functional activity of the tissue in a way that bacteria, unless of a very virulent character, will fail to produce a diseased process in the tissue for at least a considerable period of time.

Up to the present time, with all of the various agents that are suggested as antiseptics, we have none that we can say is truly a biological or a specific disinfecting agent. As I have repeatedly stated on previous occasions, all agents that cause the death of bacteria will produce destructive changes in the protoplasm in the higher forms of cellular life more quickly than they will kill the germs. Therefore, in such inflammatory processes as manifest themselves in the formation of tissue changes resulting in abscesses at the end of roots of teeth, there is greater danger of causing more pathological changes in tissue by the methods that are in vogue for the treatment of teeth than the majority of us realize at the present time.

There are several phases of inflammatory proceses which I have referred to that are considered typical of the reaction of living tissue to various forms and degrees of irritating agents. The various changes they produce in the tissue are varied in character as well as degree, and almost all of them can be found in the pathological changes which take place in the inflammatory processes of various tissues. The three kinds of changes are all of great importance when studying the pathology of local infectious processes. The first and most important of these is degeneration or necrosis; second, those involving the circulation, as well as the alteration and distribution of the fluids and cellular elements of the blood (exudative changes), third, the regenerative or reparative changes.

While it is true that one of the above inflammatory conditions may exist in the absence of both of the others, at the same time they are so closely associated with each other that it seems as if one phase of inflammation must to some extent depend upon the

other. However, all the various phases of inflammation terminating in suppuration must depend upon the nature and extent of the injury, the inherited and acquired predisposition to the action of foreign agents, with the virulent qualities of the microorganism inhabiting the tissue. The bacillus of pulp gangrene produces many changes in the tissue that differ widely under ordinary circumstances in their histological pathology from the inflammatory processes produced by the staphylococcus and streptococcus forms, which are looked upon as strictly scientific bacteria of inflammation and suppuration. The inoculations of animals with this organism in normal tissue produce no pathological changes, but when grown in the ordinary beef bouillon and filtered out and about 5 c.c. of the bacterial free bouillon is injected into the tissue, the inoculation is followed by suppuration in from twenty-four to forty-eight hours, and the pathological changes in the tissue, after the pus has been evacuated, resemble somewhat the tissue changes that are produced by the bacillus of tuberculosis.

After a close study of the organism we see that it becomes a saprophyte when introduced into tissue like that of the pulp undergoing degeneration, and that it produces some intermediate products which are absorbed by the tissue surrounding the tooth is beyond doubt. When the organism passes down through the tooth and into the vascular tissue it produces either acute, subacute or chronic inflammation, which results in destructive changes of the tissue sufficient to produce death, resulting in the formation of a cavity. If the stage is an acute inflammation it results in considerable swelling, followed by an escape of pus from the alveolar pocket, while if the virulence of the germ is not great, or the formation of an intermediate product in the process of decomposing the pulp is not extensive, there will be only a mild form of inflammation with very little activity of the bacteria themselves, and with but little destructive change in the tissue. This condition may remain for months and even years without producing any of the symptomatic conditions that characterize acute or subacute inflammation, but if a volatile agent is sealed up in the tooth, like any of the essential oils or formalin in its various dilutions, there will be at once established an acute inflammation, followed by suppuration, resulting in the formation of an abscess cavity varying in size with the virulent activity of the organism and reactivity of the tissue.—*Review.*

ERYTHROPHLEIN CHLORID IN THE TREATMENT OF SENSITIVE DENTIN. By M. Audy, Paris (*L'Odontologie*). After referring to the number of agents and devices advocated in the treatment of sensitive dentin, the author mentions the articles by Dalma and Rubrecht on the use of erythrophlein for the purpose embodied in the title of the communication under discussion. Erythrophlein is an alkaloid extracted from the bark of the African tree, the *Erythrophlœum Guineënse*. It is an extremely toxic substance with selective influence upon the heart. Injected under the skin of a frog's leg in two miligram doses it brings about inside of five to eight minutes the complete arrest of the cardiac contractions. The ventricles are the first to stop, the arrest occurring during systole; the auricles soon follow, their cessation of function taking place in diastole. The paralysis of the cardiac muscle is followed shortly after by progressive resolution, death occurring at this time. In the warm-blooded animals the alkaloid produces convulsions and dyspnea consecutive to the blood changes it induces. Post-mortem examination shows the heart soft and filled with blood, and traces of the alkaloid in the blood vessels. Atropin does not stimulate a heart paralyzed by erythrophlein. Curare retards the effects of the alkaloid.

The author reports in detail cases in which dentinal hypersensitivity of the acutest type was successfully obtunded with minute applications of a solution of the alkaloid in eugenol. His observations also show that the alkaloid possesses, apart from the property above alluded to, an inhibitory action upon the carious process. The application of the erythrophlein solution has apparently no effect upon the parenchyma of the pulp, the effect being localized to the area with which it comes into direct contact. The entire dentin region is not rendered insensible by the mere introduction into the cavity of a dressing of erythrophlein, although this limited action should be considered an advantage, for while the whole depth of dentin is not anesthetized, yet a sufficient extent of tissue is affected to permit of the painless excavation of the cavity. In the case of a first molar with a cavity in the occlusal surface and one upon the approximal side, an application of the solution in question was made in the approximal cavity only, the patient having been dismissed with an application of an almost inert substance in the occlusal cavity. A few days afterward the patient returned, and while the

excavation of the approximal cavity was carried on painlessly that of the occlusal cavity gave rise to violent pain.

The technique of application consists in the removal of as much of the disorganized tissue as possible and in a thorough dehydration of the cavity. A very small pellet of cotton saturated with a 50 per cent solution of erythrophlein in eugenol is then introduced into the cavity and sealed in with a temporary guttapercha filling. In the case of very shallow cavities instead of cotton a piece of Japanese bibulous paper is saturated and placed against the floor of the cavity. The dressing is allowed to remain undisturbed for from twenty-four to forty-eight hours, when the tissues will be found sufficiently obtunded to proceed with the excavation painlessly. It is absolutely necessary to remove the dressing inside of two days, as erythrophlein when left in a cavity for more than the stipulated time is likely to provoke slight inflammatory symptoms in the pulp and pericementum.

In young subjects erythrophlein is not as likely to induce pulp or pericemental inflammation when allowed to remain in a cavity for over two days as in old subjects. In explanation of this difference in action in individuals of extreme ages the author offers a theory which *si non é vero é ben trovato.* Erythrophlein, as already stated, is a powerful vaso-constrictor, but its constricting action affects not only the blood vessels but protoplasm in general. In young patients the dentinal tubuli are of a larger caliber than in old ones, so that when the contracted fibrillæ begin to regain their normal condition they will do it without rubbing against the walls of the tubuli. In the older subjects the tubuli have decreased in diameter owing to continued calcification and the return of the contracted tubuli to their original condition of tone is of course accompanied by friction against the walls, the irritation with consequent pain spreading to the pulp and therefrom to the pericementum.

In conclusion the author summarizes his observations as follows: First. Erythrophlein is the agent *par excellence* for the treatment of sensitive dentin. Second. Erythrophlein has no caustic action, its effect being merely one of intense vaso-constriction. Third. The insertion of the guttapercha sealing is followed by no discomfort whatever. Fourth. The symptoms of pericementitis which may occasionally develop are very slight and have no permanent influence upon the life of the tooth. Fifth. Its absolute innocuous-

ness in young patients makes it especially applicable to the devitalization of the pulps of the deciduous teeth. Sixth. A dressing of erythrophlein permits of painlessly excavating hypersensitive cavities of the third degree and of the subsequent devitalization of the pulp with arsenic with no consequent pain.

INFLUENCE OF THE FIRST AND SECOND DENTITION PERIODS IN THE ETIOLOGY OF EPILEPSY. By William P. Spratling, Medical Superintendent Craig Colony for Epileptics, Sonyea, N. Y. The author (*Medical News*) states that practitioners are never justified in looking upon the convulsions of infancy and early life as harmless manifestations. Numerous cases of convulsions which begin at these periods end in established epilepsy. A study of the etiology of epilepsy in nearly two thousand cases has led him to assert that in a considerable number the condition is the immediate or remote consequence of pathological dentition. His observations of 1,215 inmates show that the disease occurred between the first and twentieth years. The greater number of cases occurred at one year of age, when they gradually decreased up to the fifth year. With the beginning of the eruption period of the second dentition the number began to increase, and was kept on the ascendant until after the eruption of the second molar. In a second study of the 175 cases previously mentioned which developed at one year of age it was found that at the sixth month more cases originated than at any other time in that period of twelve months. The fact of importance about the rise between the sixth and seventh months is that at this period the incisors usually begin to erupt.

The statistics which the author has collected point out the fact that the greater number of cases develop concomitantly with the eruption periods of the deciduous or permanent dentitions. He quotes several specific cases, and in conclusion summarizes his views as follows: 1. Difficult dentition, i. e., the piercing of the gums by the tooth, may in suitable subjects constitute a sufficient irritant to cause convulsions. 2. In suitable subjects these convulsions may ultimately lead to epilepsy. 3. By suitable subjects I mean infants who inherited a neuropathic tendency to disease; whose parents had epilepsy or insanity, or who were alcoholic or suffered from some other general vice that could be transmitted

to the offspring in some form capable of decreasing its powers of resistance to disease. 4. I do not believe that difficult dentition alone, in a child who has inherited no ancestral taints and who at birth is free from a tendency to neuroses, can cause epilepsy. 5. Great caution must always be exercised to lay the true cause in cases of this kind where it belongs, for the reason that gastro-intestinal disorders, the sequelæ of the eruptive fevers and other factors common at this age, may produce similar results.

The author in conclusion attributes the resulting nerve irritation to the piercing of the gums by the erupting tooth, a *reductio ad absurdum,* inasmuch as it is not brought about to any appreciable extent by pressure against the overlying gingival membrane, but by *contre-coup* against the highly sensitive formative organ—the pulp. At the time of eruption the roots of the teeth are incompletely calcified, the pulps being exposed at the root-ends. The resistance offered to the eruption organ by the often tenacious and dense gingival covering being frequently greater than the force of eruption, the tooth for a time remains practically at a standstill. The calcification of the root is in the meantime progressing in the opposite direction, and meeting with as great a resistance against the surrounding bony tissue. Consequently the developing tooth becomes the opposing body to two forces, one from above and the other from below, or vice versa, according as to whether the tooth be an upper or a lower. The result of these forces produces severe irritation and pain because of the undue degree of pressure, not against the fully calcified crown portion of the tooth or the gum, which is able to withstand a relatively intense degree of pressure without any great inconvenience, but against the highly vascular and sensitive pulp.

QUADRUPLE RELATION OF MASTICATION TO GASTRIC DIGESTION. M. Dastre, professor at the Sorbonne, Paris, communicates a succinct statement, which may be regarded as the latest word of science respecting the relation of mastication to gastric digestion. We translate (*Modern Medicine*) as follows:

(1) *Mechanical.* A division of the foodstuffs into small fragments. The gastric juice penetrates cubes of cooked albumin at the rate of about one millimeter per hour. It is clear that small particles—for example, cubes presenting on each side a surface of

one square millimeter—will be penetrated in about one hour, while cubes with sides of one square centimeter will be penetrated only at the end of several hours.

(2) *Physical.* The extraction of food substances soluble in water. During mastication the saliva dissolves those alimentary substances which are soluble in water or in a neutral or alkaline aqueous liquid; but most of these substances are as pepsinogens (Schiff) or succagogs (Pawlow). The more prolonged the mastication the greater will be the quantity of saliva secreted, and because of the extraction from the foodstuffs of pepsinogens and succagogs to the great benefit of gastric digestion, an increased quantity of gastric juice containing a greater quantity of pepsin is produced.

(3) *Chemical.* The saliva transforms alimentary starches into dextrin and sugar. Dextrin is one of the most powerful of pepsinogens; if one chews insufficiently but little dextrin is produced, for the ptyalin ceases to act in an acid medium such as the gastric juice. It is true that the pancreatic juice takes up anew the digestion of the starches, but the dextrin absorbed by the small intestine is without pepsinogenic properties. It is necessary that it should be absorbed by the stomach. It is essential, then, that mastication should be prolonged to produce dextrin in large amount.

(4) *Secretory.* Pawlow has proved that the mucous membrane of the stomach is innervated, from the secretory point of view, by the pneumogastric and the sympathetic. The first is the centrifugal path of the cerebrogastric reflex. The point of departure for this reflex may be either subjective (psychic reflex) or sensory (sensory reflex). It may be produced by visual and auditory sensations, but it is especially excited by olfactory and gustatory sensations, under the influence of which the gastric juice flows abundantly. Now, the mastication of a sapid substance intensifies gustatory sensations, and consequently reinforces the sensorial gastric secretory reflex.

These different phenomena are intimately related to one another. The more one chews the more freely the saliva flows; the more saliva the larger the amount of pepsinogens and of succagog substances brought into solution, and at the same time the gustatory sensations, which are the point of departure of the gastric secretory reflex, are prolonged and reinforced.

PHENOMENA OF SUSCEPTIBILITY AND IMMUNITY IN DENTAL CARIES AS THEY AFFECT US IN OPERATIVE DENTISTRY. By C. N. Johnson, L.D.S., D.D.S., Chicago. Read before the Ontario Dental Society, March, 1905. In the attempt on the part of the profession to save the natural teeth from the ravages of decay certain phenomena have been encountered which to those who make accurate clinical observations are very significant, and which merit the closest study and the deepest insight, as affecting one of the most important problems presented for our solution.

As far back as men have studied dental caries the fact has been apparent that there is a great difference among individuals as to their liability to be attacked by this disease. Some people are practically free from it, while others are so susceptible that unless the greatest care is given the teeth they quickly break down under its influence and are lost. To account for this difference the profession naturally fell into the idea that there was a difference in the structure of the teeth, and that in the one case the teeth were sufficiently hard to resist the agent of decay, while in the other they were so soft that the agent could readily act upon them. This impression quickly gained ground among the laity, and has become so firmly implanted that it seems almost hopeless to try to eradicate it.

Then, again, another phenomenon presented itself, to the effect that there was a difference in the tendency to decay at different times in the same individual, and this, in line with the idea of hard and soft teeth, naturally led to the theory that the teeth changed in density and became at times hard and at times soft, the supposition being that during the period in which the carious process was active the teeth were soft, and when the decay ceased the teeth had become hard. We frequently hear patients make the remark: "My teeth are much harder than they were, and consequently I have less trouble with them."

This theory of "hard" and "soft" teeth—while I shall try to prove that it has little to do with the inception or prevention of caries—has after all in the minds of the profession a very plausible and natural basis of conviction. That there is a great difference in the structure of teeth would seem to be apparent from the only means of observation employed by the vast majority of the

profession, namely, through clinical experience. It is undeniable that in operating in the mouth there is the greatest difference imaginable in the behavior of teeth under cutting instruments. A chisel will readily cleave the enamel from some teeth almost without effort, giving the impression of a chalkiness which suggests softness to the operator, while in other teeth it is exceedingly difficult to make any impression whatever with the sharpest instrument. Viewed in this light, there is the greatest possible difference between the relative hardness and softness of the enamel of different teeth.

Yet these same teeth when subjected to chemical analysis will show an astonishing uniformity in the constituents of which they are composed. In fact, from the earliest investigations into the composition of the human teeth by various scientists there has been a general similarity of results when the percentage of organic and inorganic materials has been computed. Dr. Black, in his study of the physical characters of the teeth, made it an especial point to secure teeth from all classes of individuals, from the young, the aged, the robust and the delicate, and yet there was almost no variation in the chemical composition of the teeth of the different classes. It may also be said in passing that what little variation there was seemed to have no relation whatever to the tendency to caries in the various mouths.

The question quite naturally arises, If there is so great a similarity in the chemical composition of human teeth, why is it that we find such a striking difference in the behavior of teeth under instruments? It will be found that this difference is confined for the most part to the enamel, and is largely due to the arrangement of the enamel prisms. If in the development of the tooth the enamel rods are laid straight and parallel, radiating outward in regular order from the dentin with no interlacing, then we may look for enamel which will cleave readily under the chisel. If, on the other hand, the arrangement of the rods is such that they are wavy and interlaced, then we may expect enamel which will stoutly resist the action of cutting instruments. It is the physical difference between straight-grained maple and bird's-eye maple—the one will split easily, while the other will cling together to the last extremity.

However, in these two specimens of enamel there seems to be little difference in the liability to the inception of dental caries.

Please note the expression, "liability to inception." It is not claimed that when once decay begins in the teeth it will progress as rapidly in the wavy enamel as it will in the straight-grained enamel, but the idea is that so far as we can judge from statistical facts and clinical experience decay is no more liable to attack one kind of enamel than another. This may appear like an astounding statement to those who have become habituated to the idea of a close relation between "hard" and "soft" teeth and the carious process, and yet all that is asked of each member of the profession is a close observation of this question in the mouths of patients.

A most striking illustration of this point came under my notice since the invitation was accepted to present this paper before you. A young man of about eighteen applied for examination. I had seen his teeth at intervals of one or two years since he was a child, but had been called upon to do very little for them. Although he took only the ordinary care which a boy of that age usually gives his teeth, the only cavities appearing up to this time were a few small pits in the occlusal surfaces of his molars, due to developmental defects. In short, the tendency to decay in his mouth was very slight, and under the usual impression in the profession his teeth should consequently have been hard, but they were not. They looked chalklike in character, and always had since I first saw them. At this last examination I found a cavity in the proximal surface of a bicuspid, and on opening it up to the occlusal surface the enamel broke down with astonishing ease. It flaked away under the chisel almost like soft limestone, and wherever the chisel was used to trim it the enamel margin was left white and pulverized. In fact, it presented somewhat of a dilemma to establish a suitable margin against which to build a filling, and I finally concluded that the best service would be attained by the use of a gold inlay instead of a foil filling. Here was a patient who, in the generally accepted sense, had the very softest kind of teeth, and yet he had passed through the period of greatest liability to decay almost free from it.

Speaking of the periodicity of caries recalls the fact previously alluded to, that there is a variation in the tendency to decay at different times in the same mouth, and that the impression prevails in the profession that there is correspondingly a relative change in the structure of the teeth to account for it. The fallacy of this

idea must be apparent to the most superficial observer if he only stops for a moment to consider it. The very character of the teeth is such as to argue strongly against such a theory. The teeth are not being continually built up and torn down as are other tissues of the body. They are not changeable, but are the most stationary of all human structures. A tooth once formed in the jaw of a child is to all intents and purposes a finished product, so far as that particular tooth is concerned, with the slight exception of the very gradual though almost imperceptible hardening as age advances, through a diminution of the organic and a relative increase in the inorganic constituents.

This of course does not imply that all teeth are equally well developed. We frequently find definite and positive structural defects due to interrupted nutrition through the disturbances of the functions during the period of development. This may be brought about by a serious illness of the child at the time the enamel is being formed, and the effects of this illness are as plainly marked upon the enamel as if it had been dissolved with an acid. Then, again, there are many teeth in which deep pits or fissures are left in the development, even where there has been no illness, particularly in the occlusal surfaces of molars and bicuspids, and the lingual surfaces of upper incisors. These are found in the depressions of the surfaces where the islands of calcification have failed to perfectly unite. These are structural faults pure and simple, and have nothing to do with the general character of the enamel in each given case. It is true that we frequently find decay beginning in these pits or fissures, but it is also true that in many mouths decay does not begin even in these defective places. And the most significant fact of all is that we so frequently find decay beginning in surfaces of the teeth where the enamel is free from structural defects, and is as perfectly formed as it is possible for nature to make it. If decay of the teeth were a question of the tooth structure we would look for cavities only in places where the enamel was imperfect, and would expect immunity wherever the enamel was well formed, but experience has taught us to scrutinize carefully certain surfaces—the proximal, for example—where the enamel is good, but where cavities so frequently form.

If it is true then that the structure of the tooth has little to do with the inception of caries we must look to something else as

the governing factor in the case. We as a profession must know why it is that the manifestations of this disease are so different in different mouths; we must learn something of the true philosophy of the disease, so that we can the more successfully combat it. And it is confidently believed that if we study carefully the phenomena presented in our clinical experience we shall find that it is a matter more of environment than of tooth structure; in other words, that it is the conditions which surround the teeth, rather than the nature of the teeth themselves, which control the disease we are discussing.

On this basis it is not difficult to conceive that there is sufficient difference in the fluids of the mouth of different individuals to account for the varying manifestations of susceptibility and immunity which present themselves in practice. We know that with other diseases there are the greatest variations of susceptibility among individuals; indeed, if this were not true we should have in our midst some very appalling epidemics. A car full of people may be exposed to the infection of smallpox, and yet only one or two may contract it, and so it is with other infectious diseases. The medical profession has learned a great deal about the phenomena of these diseases, even to the extent of vaccinating against them, and yet there is one thing it has not learned, in which respect it is precisely in the same dilemma that the dental profession is regarding caries. No medical man can make an examination of this carload of people and tell which ones are susceptible to smallpox and which are immune. He may form an opinion on the basis of vaccination, and he may logically reason that those who have recently been successfully vaccinated are to a certain degree immune, and yet without the knowledge of vaccination he could not take the fluids of the body and by the most careful examination state definitely which individuals presented the elements of susceptibility and which immunity.

The fact is that the juices of the body are made up of many intricate compounds of which we are yet more or less ignorant, and until we become familiar with the characteristics of these juices we cannot hope to fathom their full bearing on the question of susceptibility and immunity. In the March number of the *Dental Review*, 1894, in an editorial on "The Prevention of Caries," I wrote among other things as follows: "We believe, then, that the problem of preventing dental caries must be worked out along

other lines, and we have a suggestion to make as to what these lines shall be. It would seem patent, in view of the foregoing, that if we are to accomplish anything permanent in this direction we must so change the conditions of the mouth that the microorganism of dental decay cannot exist therein. To attempt this may seem utopian, and we are not unmindful of the difficulty of the problem, but we are convinced that this is the only certain way out of the dilemma.

"When we speak of changing the conditions we refer to something deeper and more subtle than a mere chemical reaction. There are agencies at work affecting the life forces of the human economy, concerning the nature of which we to-day know comparatively little. We may recognize an idiosyncrasy, but we are not capable of defining the causes which lead up to it. For instance, there are individuals in whose mouths caries is seldom or never seen, while there are others with teeth as well developed, and where even greater care is taken, who lose their teeth bit by bit despite the most persistent effort to save them. The logical conclusion seems to be that in the one case there is a subtle condition present in the mouth which militates against the active agency of the microorganism, while in the other the conditions are favorable to its development.

"At the present time we are wholly unable to distinguish between these two conditions—we can see only the results. But the time will come when we are able to recognize these conditions and treat the patient accordingly. The idea of vaccination for the prevention of dental caries would offer a most delightful topic for the newspaper humorist of to-day, and yet who knows what the future may develop. One thing seems certain—we must learn more than we now know regarding the conditions that are favorable or otherwise to the propagation of the microorganism of caries, and we must also learn how to modify these conditions before we can hope to successfully prevent decay of the teeth."

While we are morally certain that the chief factor in dental caries is something connected with the fluids of the mouth, yet we cannot by an examination of these fluids determine in advance whether or not the teeth in a certain mouth are likely to decay. It is true that in recent years Michaels of Paris has been studying the saliva, with the end in view of determining the particular elements in it which may be considered pathognomonic of certain

diseases, and I hope that in the future something may be accomplished along this line. At present all we have to go by are the clinical manifestations as we observe them in practice, though these are very significant to one who has studied the matter from the proper point of view.

Just as soon as we reconstruct our preconceived ideas regarding the relation of "hard" and "soft" teeth to dental caries, and recognize the fact that it is a matter more of environment than of tooth structure, just so soon do we begin to realize a new significance and a new possibility in the practice of dentistry. So long as we believed the question to be one of tooth structure we were completely helpless in the attempt to control the difficulty, further than merely to fill the decayed teeth as fast as they developed. We could not change the tendency to tooth decay, because we could not change the tooth structure, but when it becomes a question of the conditions surrounding the teeth we are placed in a more intelligent and a more hopeful relation to the matter, because we find that it is possible to change the conditions. It is to this phase of the question that I particularly wish to invite your attention.

In studying the clinical manifestations of susceptibility in the mouth we find, as has been said, that there are certain periods of life when the teeth are more subject to decay than at others. The period of youth may be considered the one in which there is the greatest liability to decay, and it has been stated by a careful observer that if we can successfully preserve the teeth up to the twenty-fifth year we have then carried the case to a point where the danger of losing them through decay is very materially lessened. It is true that in many instances where a condition of apparent immunity has been established some change in the environment may occur to make the mouth once more susceptible. For instance, a serious illness may be followed by a general breaking out of caries, and in this connection I wish to point out a fact which to my mind is very significant. It was formerly thought that the illness resulted in a deterioration of the tooth tissue, which accounted for the renewed attack of caries at that time; but aside from the fact already stated, and which we now believe to be true, that the teeth are not sufficiently changeable in structure to bear out this theory, there is another manifestation connected with the question worthy of the closest consideration.

I have studied this matter somewhat carefully among my own patients in recent years, and find that there is an ever-lessening tendency toward post-illness caries as time goes on. Why is this? If it were true that the tooth tissue had anything to do with it we should find the same outbreaks as formerly, because people are surely taken as seriously ill to-day as ever, and they have their vitality lowered fully as much and still recover. Why, then, is it that their teeth do not decay so readily? I am convinced that it is due to the fact that physicians and trained nurses recognize the necessity for oral hygiene more and more, and during an illness the nurse is instructed to brush the teeth carefully and keep the mouth clean. It is rapidly being realized in the medical profession that the mouth forms one of the best culture fields for microorganisms, and that through this medium many pathogenic bacteria may gain entrance to the body. The attempt to keep the oral cavity clean prevents the development of such conditions as render the mouth susceptible, and the teeth of our patients do not suffer so much after an illness. So we again come back to the question of environment as being the chief factor in dental caries.

Parenthetically, I may say at this point that it is not a matter of mere cleanliness. It is true that if we could always keep the surfaces of the teeth perfectly clean we would thereby prevent caries, but in the mouth this is quite impossible. Cleanliness is to be very highly commended, but there is something above and beyond this which largely dictates the issue—it is the idiosyncrasy in each mouth which governs. If this were not true why should we find so many instances where no attention whatever is given to the teeth, and yet decay is almost entirely absent, while in other mouths where the greatest care is taken the teeth constantly demand the attention of the dentist? Of course in the latter instance it is undeniably certain that if the teeth were neglected they would rapidly go to destruction. In other words, we may find in two mouths teeth practically the same in structure, but which show, with equal care or equal neglect, the greatest difference imaginable in their liability to decay; so there must be something aside from cleanliness which enters into the case.

Speaking of the periods during which decay may be looked for, we frequently find an activity of the carious process in old age. Teeth that have lasted for a lifetime sometimes melt away

in an astonishing manner as the patient begins to show signs of decrepitude. This form of decay, however, is in many cases peculiar to itself, and seems to be the result of a recession of the gums, leaving the teeth exposed beyond the gingival line. Without the protection of the enamel the teeth soon become girdled by decay until they are in some instances almost cut off at this point.

Then, again, a change of climate sometimes seems to induce a condition of susceptibility. People coming to this continent from Europe often experience trouble with their teeth, where before they had been practically free from it. There are many of these manifestations which require more careful study on our part, and it remains for some earnest investigator to search out the particular elements in the fluids of the mouth which act as the governing factor in controlling the tendency to dental caries.

The most that we can do now with our present knowledge is to observe the clinical manifestations in the mouths of our patients, and direct our practice along the lines indicated by such observation. I may say in this connection that while, as just intimated, the fluids of the mouth may be more or less a hidden volume to us, we have a very vivid index to some of the conditions of susceptibility before us in our everyday practice. The mouth in which caries is progressing rapidly has something distinctive in its appearance, something which is exceedingly difficult to describe, but which is readily recognizable by one who has studied this matter carefully. I can give only in the most crude and imperfect manner a few suggestions for observation on the part of those who care to make this kind of study a feature of their future work, and I can confidently recommend such study as being the basis of the most intelligent and successful management of what in the past has proved a discouraging and even a desperate class of cases.

In the most typical case of all, that of a child from six to sixteen years of age, we find some of the following manifestations present when the carious process is active: Teeth generally coated with a glutinous material which seems difficult to brush off, saliva thick and ropy, foreign matter clinging readily to the surfaces of the enamel, gums somewhat highly colored, with the festoons enlarged and spongy. The mouth has an unkempt appearance as if entirely neglected by the patient. If food particles are lodged between the teeth, and the patient is given a glass of water to rinse the mouth,

there seems to be but little effect from the rinsing, the accretions still clinging to the teeth as before. In using pumice or other insoluble powder for cleaning the teeth it will adhere to the gums and the interstices about the teeth, and cannot be readily rinsed away. In short, the secretions of the mouth seem unduly thick and viscid.

With a mouth in this condition the dentist usually has a case of susceptibility to dental caries before him, and the problem is presented of changing this condition to one of immunity. This latter statement implies that it is not beyond the province of the practitioner to render a susceptible mouth immune, and within reasonable limits this is true. We find in the history of most cases, if anything like ordinary care is given the teeth in the way of hygiene and dental service, that the tendency to decay rapidly diminishes from about the sixteenth to the twentieth year, though of course if a case is neglected entirely it is quite likely to go on from bad to worse until all the teeth are lost. The function of the dentist lies in bringing about in the mouth of his patient a cessation of the carious process earlier by several years than would occur in the usual course of events. In fact, the dentist should work with this end in view in all young patients, not with the mere idea of filling cavities in teeth, but with the object of so changing the conditions of the mouth that the environment will be less favorable for the advance of caries.

The question arises as to how this may be accomplished. At the outset it should be stated that there is nothing miraculous or medicinal about the treatment, but merely an institution of such hygienic and preventive measures as every dentist has at his command. The first thing to do with such a mouth as this is to clean it thoroughly. Stir up the stagnant conditions as they never were stirred before. Let the gums bleed freely if they will during the cleaning. Syringe the mouth vigorously with a tepid antiseptic solution, and keep up this process until you have changed the reaction in the mouth for that one time at least. Then impress upon the patient the necessity for the most scrupulous attention to the teeth and gums, and explain the physiology of so caring for the mouth as to bring about a change in the conditions surrounding the teeth. Patients are quick to catch such points as these if we take the pains to instruct them. Then institute an active cam-

paign against decay in the mouth. Keep down the cavities, no matter how often you have to see the patient. Fight decay as you would a deadly enemy, and arrange to examine the teeth every two months if necessary. Neglected cavities encourage the formation of new ones, and the prompt suppression of cavities tends to limit the liability to decay. If this kind of effort is put forth it will not be long before the results will begin to show, and a case which at the outset seemed discouraging will prove amenable to successful treatment. The fluids of the mouth will clear up and become thinner, and the mouth can readily be rinsed free from debris.

This is the one supreme lesson of the study of susceptibility and immunity in its practical application to our everyday work—that no matter how bad a case of dental caries we have presented for our consideration, no matter how discouraging the outlook may be for the ultimate saving of the teeth, we can have the assurance that if we institute the proper plan of treatment we shall surely sooner or later bring about such a condition that in the natural order of things the teeth may be saved and made serviceable for life, at least so far as dental caries is concerned. My final plea is that you take this subject home with you and study it in the mouths of your patients—study it from the point of view so imperfectly outlined in the present paper—with the firm conviction, in my own mind from my own experience, that you will be doing infinitely greater good to humanity than is ever possible by hedging behind the all-too-prevalent fallacy that the teeth of many unfortunate individuals are so soft that they can never be saved by filling. Most teeth can be saved, and they will be saved if we do our duty.—*Dominion.*

REPORT ON FORTY-NINE CASES OF ARTIFICIAL DENTURES SWALLOWED. By Arthur D. Black, B.S., M.D., D.D.S., Chicago. Read before the G. V. Black Dental Club of Chicago. In making a classified card index of the articles published in the *Dental News Letter* and *Dental Cosmos* a few years ago many interesting and often perplexing questions came up as to where certain articles would be best classified. Many changes were found to be necessary in the classification made out at the beginning and a number of entirely new divisions were required. It is doubt-

ful if anyone, in making out a list of classes into which articles published in our dental literature might be conveniently grouped, would think a division necessary for those on artificial dentures swallowed, yet such proved to be the case. The first few of these articles were classified under artificial dentures, but as the work progressed the number gradually increased until there were enough to justify placing them in a separate group. Out of about twenty thousand articles classified, extending over a period of fifty-six years, there were reports of forty-nine cases of artificial dentures swallowed.

I have gone over these reports very carefully and have tabulated them in various ways with a view of bringing out some of the interesting facts. It is rather wonderful to notice nature's tolerance in some of the cases, and the apparent lack of sensation manifested by several patients who swallowed plates and retained them in the esophagus for a considerable time, several months in two cases, without the slightest suspicion that there was any particular trouble—only a sore throat. It is rather wonderful, too, that some of these plates, carrying from six to ten teeth, could have been swallowed at all, and when we notice that plates carrying five, six and even seven teeth have passed entirely through the digestive tract without any injurious effects or much discomfort, it helps us to realize that we are really wonderfully made. It is also interesting to note that six cases were operated upon, three esophagotomy, two laryngotomy and one tracheotomy, and all recovered. Several of these operations were performed nearly fifty years ago.

Of the forty-nine plates swallowed, thirty-four were metal, eight of vulcanite, and seven, material not mentioned.

The number of teeth on the various plates was as follows: One without any, five had one each, ten had two each, four had three each, six had four each, five had five each, three had six each, two had seven each, one had eight, one had nine, one had ten, and ten, number of teeth not mentioned. Many of them had clasps, which were probably the most dangerous parts, and were doubtless the cause of several of the deaths. I think it likely that most of these plates were of the "horse-shoe" variety, carrying one or more of the upper front teeth. This style of plate was a very common one, the custom among dentists for many years being

to make either a full denture or a "horse-shoe" carrying a "set of fours" or a "set of six" front teeth. This might account for the cases in which the plates remained in the esophagus so long without discomfort, the palatal portion of the plate fitting closely to the wall of the esophagus and not offering much obstruction to the passage of food.

The conditions under which the plates were swallowed were the following: Seventeen during sleep, ten during fits, mostly epileptic, one during puerperal convulsions, seven while eating or drinking, one during a fall, and thirteen, condition not mentioned.

Of the forty-nine plates nine lodged in the pharynx, twenty-seven in the esophagus, two in the trachea and one in the stomach. Nine passed through the entire digestive tract without giving the patients any trouble, although several of these must have lodged somewhere in the stomach or intestines as shown by the time occupied in passing through. One was not found, although the patient died and a post-mortem was held. Three of those lodging in the esophagus were pushed through into the stomach and passed on without difficulty, making a total of twelve that passed through the bowels. Of these three had two teeth, one had three, one had four, two had five, two had six, one had seven, and two, number of teeth not mentioned.

One of the most interesting tabulations is that of the number of days occupied in the passage of these plates. One was two days, two were three days, one was five days, two were seven days, one was nine days, one was twelve days, one was one hundred and eleven days, and three, time not mentioned. It is rather remarkable that the plate which was in the body one hundred and eleven days did not cause any serious trouble. We should think that there would have been an erosion of the tissues where it was lodged, or that it would have caused an obstruction.

Of the nine plates lodged in the pharynx one caused immediate death by lodging above the epiglottis and closing it. Another remained in the pharynx four and one-half months and was removed post-mortem, the patient dying of bronchitis. Five were removed through the mouth, by the fingers, or forceps, after remaining in the pharynx varied periods of from a few hours to five months. The plate that remained in for five months was a rubber piece carrying five teeth, swallowed during sleep. The patient had com-

plained of sore throat, but never suspected having swallowed the plate. The other two were removed by pharyngotomy and recovered. A peculiar result of one of these operations was the changing of the patient's voice from tenor to bass, supposedly on account of the vocal cords being thickened afterward.

Of the twenty-seven lodged in the esophagus two caused ulceration into the aorta and death, one was pushed down the esophagus nearly to the stomach and remained there three months, when death intervened. Three were pushed into the stomach and passed through the bowels. One remained in the esophagus nineteen days, was pushed into the stomach and was vomited ninety-seven days later, making a total of one hundred and sixteen days in the body. Five others were either vomited or coughed up, one of the patients dying eight days later as a result of inflammation. Another remained in the esophagus fifteen months and the patient, who had swallowed it during a fit, never suspected it to be the cause of a sore throat during all these months. This plate was coughed up. Ten of this group were fished out via the mouth, having remained in from a few hours to three and one-half months. Three were removed by operation of esophagotomy and all three patients recovered.

Of the two in the trachea one caused death within a short time, the other was removed by operation and the patient recovered.

The one mentioned as having lodged in the stomach was fished out with an esophageal coin-catcher.

One plate carrying two teeth was swallowed and the patient died a week later. The plate could not be found post-mortem.

There were ten fatalities out of the forty-nine cases, as follows: Four caused ulceration through wall of esophagus into aorta, pericardium or lung. One died of bronchitis, one on account of closure of the glottis, one lodged in the trachea, causing asphyxiation, one was found low in esophagus, post-mortem, death having occurred in three months; one died of inflammation after having vomited plate up, and one died a week after swallowing plate, but plate could not be found post-mortem.

Thirty-nine patients recovered; of these cases, twelve plates passed through the entire digestive tract, fifteen were fished out through the mouth, six were vomited or coughed up, and six were removed by operations through the neck.—*Northwestern.*

PATHOLOGY—SOME POINTS ON IT. By J. D. Patterson, D.D.S., Kansas City, Mo. Read before the St. Louis Society of Dental Science, February 17, 1905. It is surely a hopeful sign of the times that there is a considerably increased attention being given to the positive and radical treatment of the diseases found in the tissues adjacent to the dental arch. Many members of the dental profession are more impressed than ever before with the necessity of prophylactic treatment for the oral cavity, and are also being compelled to admit that former disbelief in the effective and possible cure of degenerations of the oral mucous membrane and underlying parts was incorrect, and that the most remarkable results follow the intelligent and scientific care for mouth sanitation. This has come about largely through the recent work of Dr. D. D. Smith of Philadelphia, in his practice and writing upon diseases of the oral mucous membrane. Modern pathology does not carry with it a terrorism which used to be with us when dealing with pathological conditions twenty-five years ago, but instead we have come to more clearly understand the etiology, prognosis and therapeusis, and approach the pathological situations with a positive confidence that our surgical efforts, conducted with patient attention to detail, will be rewarded with the blessings of our patients and the satisfaction of duty well performed on the part of the operator. I am therefore fortunate to be able at this time, which everywhere signalizes the importance of hygienic conditions in the vestibule of nutrition—the oral cavity—to point out a few matters of interest along pathological lines.

Twenty-five years ago our more advanced scientists gave to the world the bacterial origin of disease, and since that time enormous strides have been made in the etiology and progress of disease and its alleviation through the means of "serum therapy." The modern observer cannot fail to have seen one undeniable result, and that is, that the large majority of men, both medical and dental, immediately went into bacteriological research, believing that they would find a specific bacterial origin for nearly every pathological condition known. The search has no doubt been overdone, the pendulum is swinging the other way, and to a reasonable course. The country has been deluged with a flood of antiseptics, and each pathogenic bacterium has had its antitoxin, until it may be seriously questioned whether some of the results have been good or ill. The ever-

present microscope has examined blood conditions, tissue conditions, exudation conditions, and upon finding a persistently present microorganism has at once pronounced it, *de novo,* the disease cause, without usually considering if it might not be a subsequent production. The microscope *does* see things, but unfortunately it does not see the beginning of the bacterial life and determine what disease will *per se* be the result of a certain form. Again, the microscope is the most fallible of instruments. Your late fellow-townsman, Dr. J. N. Love, said in 1902, *"A man looking through the small end of a microscope may discover bugs and get alarmed by them much in the same way that a sufferer from delirium tremens sees snakes."*

Some of our friends working along these lines have discovered recently the specific microorganism of pyorrhea alveolaris. It reminds us that the specific microorganism of cancer has been discovered again and again, but within a few days the cancer commission of the Harvard Medical College, with a fund of $100,000 for investigation—after a four-year research—officially says, *"No more is known of its origin now that at the beginning of the Christian Era. It is a supreme mystery."* The commissioners also say, "Just one thing can be done for cancer—that is, get it out early and quickly; *drugs have never cured cancer,* and if this could be impressed upon the public it would save thousands of lives." The microscope in past years has by its unfailing eye detected human blood, and has been supposed to be infallible, and now modern research has proved that precipitation methods are the only ones at all to be depended upon, that the microscopic tests are unreliable, and even with the "precipitin" method human blood cannot be distinguished from that of the gorilla, the chimpanzee, and that of the anthropoid apes. What a terrible lesson this is to the microscopist, when he sees and knows that hundreds of human beings have been sent to the scaffold or to oblivion through the supposed unfailing microscope! These are the recent conclusions of Metchnikoff and Nuttall in their researches in modern pathology—the men who to-day stand in the lead in pathology in France and England.

Resemblances in blood-corpuscles and resemblances in persistent tumor cells have caused enthusiasts to forget that all animal cells have characteristic appearances, and that a diseased cell at different stages exhibits various forms and disease-fostering capabilities, de-

pending entirely upon its environment. If these life-long searchers have found the fallibility of the microscope, then we may be pardoned if we doubt the conclusions of embryo-lookers through the *small end of the microscope,* who declare to us that pyorrhea alveolaris is a disease of a specific microorganism. The specific bacteria for pyorrhea has been laboriously sought for by Hugenschmidt and Chouet of Paris, and Goadby of London, and the research was unrewarded, the judgment of these investigators being that there is no specific microbe of the disease and that pathogenic forms found in the disease are subsequent to the inception of the disorder.

As aforesaid, the bacterial cause of pathologic conditions has in recent years become so rooted that if one ventured the assertion that there were pathological conditions and inflammations without the influence of usually specific bacteria, he was at once put down as an ignoramus by the newly-fledged scientist and looked at askance by the embryo microscopist. Yet to-day we are confronted with the fact that the Miller teaching of a specific caries bacteria is no longer held even by Dr. Miller himself. Chouet says a specific microorganism of caries is "*an impossibility.*" This a few years ago would have been looked upon as the rankest heresy, and we who have been teachers and followed the painstaking experiments of Dr. Miller and taught his conclusions to our classes have reason to feel very humble to-day in the light of modern pathology. The cry of *specificity* in bacteria no longer summons the careful observer to its standards. Instead we find a return to the teachings of Nagëli and Bilroth, who claimed that *all bacteria had a common source, and that the different forms and actions only represented alteration of action of the same form at different stages of development and under different circumstances; in other words, that a coccus could be transformed into a bacillus, and vice versa, and that in one instance the same plant caused fermentation, in another putrefaction, and that all infectious diseases were caused by the same microbe.* In modern pathology we find a strong tendency to return to at least some of the premises given above, namely, that the form of the microbe changes with environment and food media, and that a nonpathogenic microorganism may in changed surroundings develop pathogenic powers. This is surely in harmony with nature and with evolution. Goadby, the first of English dental investigators, agrees to this and says—"Not to admit such a develop-

ment of pathogenic power entails the obscession that pathogenic bacteria were created by design to destroy human life, and, moreover, such a refusal places us at variance with the monistic conception of the universe and the orderly law of evolution with which all observed phenomena accord."

A few years ago it was taught that bacteria caused inflammation and without them there was no inflammation. In 1890 Dr. Nicholas Senn, in his work, "Principles of Surgery," says—"The term inflammation in the future should be limited to the series of histological changes which ensue in the living body from the presence and action of specific microorganisms."

Modern pathology teaches that ere the final destruction and liquefying of cells and tissue the action of microorganisms—not necessarily specific—is always present, but from the inception of injury or perversion of function, the hyperemia, swelling, heat, redness, pain and other manifestations, which are strictly definitive of the word "inflammation," are usually manifested without the interference of any bacteria—specific or non-specific. The efforts of Dr. Senn, Prof. Roswell Park and others to confine inflammatory conditions to the growth of microorganisms and the action of their alkaloids do not appeal to the modern pathologist. No more does the past prevalent claim that each so-called class of tumors owes its inception and growth to a particular specific pathogenic microorganism which can be detected with the microscope and differentiated from each other class. But it has come to be acknowledged that specificity is somewhat of a bugbear—that a benign growth may become malignant if sufficient destruction of function, irritation and pressure are present, and the microscope says to the intelligent only that there is present a certain cell form—if the irritation and predisposition are mild one form is found; if active, the cell form has undergone a change just as the *bacteria* present have changed.

In the treatment of tumors of the oral cavity I formerly conscientiously preserved portions for the microscopist. These were from epuloids, epitheliomas, fibroids, and polypoids of the antrum—and with scarcely any deviation the report came back, "little cell sarcoma," also once or twice a note that giant cells were forming and that radical treatment and removal of the entire maxilla would be at once advisable. I am now no longer alarmed by the "little

cell sarcoma" verdict. Of course there are small undeveloped cells in all foreign growths, masses of them, how could it well be otherwise? But they are not the indication of malignancy. The history and physical appearance of all tumors is to-day our post positive aid in diagnosis, and the microscope is only an adjunct of variable worth. At all points of destroyed function by whatever irritation we find perverted tissue cells and an area is formed in which microorganisms soon proliferate.

The health current is like a rushing stream. Like a stream, it carries with it something more than is always evident. The stream bears often much that might contaminate, but it is borne swirling along in the overpowering current and not permitted to pollute the pure water. Who has not seen the stream overflow its banks, and upon receding leave isolated patches of water which soon became the breeding places of low forms of life until a draught of it might be poison? So with the nutritive current. Débris and microorganisms have no power to harm when the vital forces are in harmonious and uninterrupted ascendency. Even the pathogenic microorganisms of the most virulent type are crowded along without rest and eliminated; but should an area of weakened cell activity lessen the usual nutrition or the action of an organ, then so sure as pathogenic forms are present just so sure are we brought to know that their biology is to grow, to digest and destroy, and to multiply as an organized life of all forms.

In modern pathology we have spoken of the unusual, widespread, and newly-awakened interest respecting mouth sepsis as a disease cause in relation to general medicine. Dr. D. D. Smith was not the first one to attract attention to this field even in the dental ranks. Scores of dental writers for many years have warned about unhygienic mouth conditions. Three years ago the famous Dr. Hunter before the British Medical Association argued that many diseases of the digestive tract were due to infection from the mouth. Mr. Goadby, Mr. Godlee and others have also spoken strongly upon infection from fermentation and putrescence in the oral cavity, but the prolific and vigorous writing of Dr. Smith, of Philadelphia, it must be admitted, has aroused recent attention to the matter in America such as that of no other author, and to-day we find an increase in the attention to oral sepsis which has made a stir.

In my opinion it is a very hopeful sign. We scarcely can ap-

preciate, until we study the subject, how far-reaching is the injury to general health by mouth infection. I have had well-marked and easily-noted improvement in general physical appearance and digestion by successfully concluding the treatment of pyorrhea, and have received more gratitude from patients in this work than in any other field. The fermentation and putrefactive processes going on in cheesy, organic masses of food débris and bacterial growth, *without* any pyorrhea, frequently exhibit poisonous matter quite sufficient to not only injure digestion, but also infect the lungs. If food before being put in the mouth were contaminated as it is after being placed in the mouth, would it be accepted? No, it would be shunned like poison. If the air we breathe were laden with odors before entering the air passages as it is after being in the vestibule of the mouth, how quickly the nostrils would refuse it. To correct this too prevalent state of affairs is, I am proud to say, one of the growing fields in modern dental pathological conditions. It is bound to rapidly become more general, and the forward march of oral prophylaxis must be conscientiously undertaken and accomplished if we desire to do our whole duty to humanity.

It is fortunate, indeed, that the healthy human digestive apparatus can take of so much poison. The coats of the stomach and alimentary canals bid defiance to much that poisons, but when an area of low vitality is reached, either in local or general systemic conditions in any portion of the alimentary tract, then many toxins originating in the mouth exert their bale influence.

I cannot refrain from referring to modern success in treating that bête noir of all conscientious dentists—pyorrhea—and from saying that there is no point in modern pathology and its treatment that has given such encouragement to the careful practitioner, when he has found that this disease, so dreaded and in former times deemed incurable, is a disease which is one of the *most amenable to treatment*—the success depending only upon nice attention to detail—surgically and medically. It has been lightly said, but with perfect truth, that in these days a greater number of the dental organs are lost through the ravages of pyorrhea than from decay, and if in the study of the pathology of this trouble we have found it chiefly dependent upon local conditions, and the cure assured in painstaking care of those local conditions, then indeed should we congratulate ourselves as a profession. In my opinion *this is true.*

Personal experience has proved that local treatment is the sine qua non, and no more am I discouraged by those who assert that the disease is systemic and incurable save by systemic treatment?

The rheumatic diathesis and the uric acid diathesis have no terrors for me nor for many others who, following the teaching of common sense and pathologic logic, proclaim that, *"If all local irritation is removed from the cervical and root portions of the teeth, and those surfaces smoothed and retained in a non-irritant and sanitary condition, a cure will unquestionably follow."* This is one of the triumphs of modern treatment of dental pathologic conditions. Let it not be thought for a moment, however, that systemic predisposing conditions are to be ignored. These must be looked after just the same as in all other local irritations and infections, upon the well-known principle that any general bodily condition prejudicing nutrition and perfect cell metabolism lessens the antiseptic work of leucocytes and presents a physical condition which favors local disease with even slight irritation, but let us keep in mind that modern pathology teaches that, even with depraved metabolism, tumors, neoplasms, catarrhs, caries, stomatitis, etc., *are not found without local irritation.—Brief.*

IMMUNITY—A REVIEW OF THE PREVAILING THEORIES CONCERNING IT.—It is generally believed (says the *Monthly Cyclopedia of Practical Medicine*) that the prevailing theories of immunity are extremely difficult to understand. This is due mainly to the fact that new technical terms have had to be introduced in order to avoid explanatory sentences each time a particular constituent is referred to. As each investigator has interpreted the functions of these various constituents in his own special way, he has deemed it necessary to rename the whole series, so that each substance actually found is now the bearer of many distinguishing appellations, to say nothing of the substances hypothetically introduced in the processes and also given various names. Bereft of these obscuring features the three prevailing theories, however, lose their complexity in a great measure.

Metchnikoff's Phagocyte Theory.—Metchnikoff, who began his investigations in 1865, terms "phagocyte" any cell capable of incorporating bacteria and of destroying them by a process of digestion. Haeckel (1862) saw leucocytes ingest indigo; Recklinghausen

(1863) noted that pus-cells ingulfed cinnabar grains; Cohnheim (1867) saw leucocytes plunge their pseudopodia through vascular stomata and thus leave the vessels to become pus-cells. Even Metchnikoff's antagonists have recognized that the leprosy bacillus, the gonococcus and other microorganisms are always found in cells, while he has himself shown that they can ingest living anthrax bacilli. These organisms, having conquered the cells, passed out into the hanging drop, multiplied therein, and proved virulent on inoculation. As observed by Cantacuzène, anthrax bacilli injected in a vein of a rabbit's ear are destroyed in seven minutes in the liver, in eight minutes in the lungs, and in one hour in the spleen. The organisms that escape from one cell are seized by others, but if their multiplication is excessive they overpower the phagocytic leucocytes and invade the blood-stream.

Various observers, Pfeiffer, Büchner and others, having demonstrated that the blood-serum and other body-fluids were likewise bactericidal, Metchnikoff ascribed this fact to the disintegration of phagocytes, the properties of these cells being thus imparted to the serum. As shown by Bordet and other French investigators, this property is due to two constituents of the plasma. The one (the specific immune body) circulates in the plasma, according to Metchnikoff, and resists a temperature as high as 100 degrees C. The other or "cytase," thought to be derived from disintegrated phagocytes, is destroyed by heating to 55 or 56 degrees C. thirty minutes, and is considered by him as belonging to the category of trypsins.

Bulloch, in his review of the bacteriological side of the question of immunity for the section on pathology at the recent meeting of the British Medical Association, states that "thousands of facts point to the conclusion that our leucocytic-forming tissues are our great defensive organs against parasitic invasions," but that "the mystery is how the microbes are destroyed."

Büchner's Alexins, or the Humoral Theory.—The view that the serum is endowed with bactericidal powers has been ably defended by Pfeiffer, von Fodor, Nuttall and others. Their labors led to a doctrine of which the late Professor Hans Büchner was the main exponent. Both he and Hankin isolated substances which they termed "alexins," and to these bodies they ascribed the power to confer immunity. They were also thought by Büchner to be

derived from leucocytes (oxyphil) and kindred cells. Laschtscenko having isolated them from living leucocytes, the bactericidal action was thought by Büchner to be due to a proteolytic enzyme, similar to the ordinary digestic ferments. The "alexins" were found to lose their bactericidal power, however, when exposed thirty minutes to a temperature of 55 degrees C.

Büchner recognized Metchnikoff's doctrine only to a certain extent, the phagocytes being considered by him as mere scavengers capable of removing from the blood various substances foreign to it, including bacteria weakened by the alexins. The cells were deemed incapable, however, of carrying on an active warfare against pathogenic microorganisms in general. Grüber was also led by a large number of experiments to conclude that the actual destruction of bacteria in all animals, "whether actively or passively immunized," was due to Büchner's alexins, and that these alexins were "general protective substances entirely without specific action." According to Grüber, the bacterial cell walls were first made adhesive by the blood's agglutinins and thus became vulnerable to the destructive action of the alexins. Büchner's alexins were soon found deficient in many particulars, but the many valuable paths his labors and those of his pupils have opened have been utilized in the elaboration of other hypotheses.

Ehrlich's Side Chain Theory.—This theory, advanced by Ehrlich in 1897, aimed to harmonize the results so far reached in the study of natural and artificial immunity, and particularly the formation and mode of action of the immunizing constituents of the blood-serum. Reduced to its simplest expression, Ehrlich's theory is on the whole not a complex one, and is based on recognized biological and chemical principles. The body being composed of colonies of cells which differ from one another in their functional attributes, nerve-cells, muscle-cells, gland-cells, etc., we speak of the specific action of drugs, because each kind of cell has a special affinity for certain drugs. Thus, the cerebrospinal motor cells have affinity for strychnin, the cardiac muscle-cells for digitalis, the sweat and salivary gland-cells for jaborandi, etc. Now, toxins differ in no way from remedies in this particular; they also are specific owing to their cellular affinities, toxins being also taken up by specific cells. This specific action of toxins represents the foundation upon which Ehrlich's theory is poised. The theory itself is

based upon the mechanism of cell-nutrition in its relations to the mode of production of specific antitoxins, or bactericidal and antitoxic sera.

The complexity of cellular protoplasm is well known to biologists. Ehrlich assumes that each cell contains an active central nucleus and groups of molecules, or "side chains." These outer or extranuclear groups constitute a cardinal feature of the entire scheme, since each of them has for its function to receive (hence the term *receptor* given by Ehrlich) the molecules of food-stuffs which perpetuate the cell's existence. These molecules Ehrlich terms *haptophores* (from two Greek words meaning to touch and to bring) owing to their identity as extrinsic carriers. A cell's nutrition is thus carried on through the affinity its "receptors" or "side chains" have for its haptophores.

Unfortunately, the receptors do not combine with these nutrient substances only; their affinity extends to substances which are in a measure their chemical analogues and which may include harmful bodies. Thus a poison, a toxin or a venom may contain the same elements and the same number of them as a nutrient molecule or haptophore, the only difference between the latter and the pathogenic molecule being a different arrangement of their respective atoms (isomerism). The formula of turpentine, for instance, is $C_{10}H_{16}$, while that of oil of lemons is also $C_{10}H_{16}$, and yet their properties are quite dissimilar. The same may be said of ethyl formate, methyl acetate and propionic acid, all of which have a molecular weight of 74, and the same formula—$C_3H_6O_2$. This makes it possible for a cell to take up (combined with its nutrient haptophores) any number of isomeric non-nutritious bodies, and when one of these happens to be a toxin—thus forming what Ehrlich terms a toxophore—the latter combines with the cell, and if sufficiently active qualitatively and quantitatively, may act destructively upon it.

If the toxin is not sufficiently active to destroy the cell or inhibit its functions the latter seeks not only to rid itself of the poison, but also to protect itself against further aggressions from this poison and its isomers. Intoxication being due to a toxin, for instance, the toxin group of the haptophoric molecule attaches itself to the receptors and then reacts actively upon the cell proper. The receptors themselves being destroyed, the cell (in keeping with

Weigert's theory of overproduction) not only replaces them by reproduction, but the process is so active that many more receptors are created than are required by the cell itself, and they accumulate in the blood and lymph. A very prominent feature of Ehrlich's theory appears in this connection, namely, that these surplus receptors preserve their affinity for their specific haptophores and therefore for any isomeric toxin that may combine with it. The receptors thus become the cell's protectors, since they capture, as it were, and hold the toxin before it can at all reach the cell proper, thus immunizing the latter against the poison. Diphtheria toxin, for instance, by exciting the cells for which it has specific affinity, causes these cells to liberate receptors in large quantities, and these, by at once combining with the rest of the toxin in the blood-stream, curtail its morbid effects. *Antitoxin,* according to Ehrlich, owes its curative properties to the receptors (side chains) it contains.

The element of specificity, so evident in all immunizing processes, is easily explained by Ehrlich's conception. As the different cell-colonies constitute clearly defined and autonomous groups, each of which reacts under the influence of poisons which affect none of the other groups, a poison can only cause the production of one kind of receptors, and these receptors injected into another animal can only neutralize that one poison and its isomers. Again, the body being vulnerable only to the toxins with which its cells' haptophores can combine, it follows that Ehrlich's theory covers all diseases caused by toxins and the processes through which the body acquires immunity against them.

The destruction of the more solid pathogenic agents, such as bacteria, yeast-cells, worn-out blood-cells, tissue débris, and other cellular structures, requires the aid of additional factors—*i. e.,* cell "poisoning" or "killing" agents, which Ehrlich has termed *cytotoxins* or *lysins.* These bodies, according to Ehrlich, not only appear in the blood when useless (and therefore harmful) cellular materials are to be dissolved, but each body is essentially specific as a solvent. Thus, when blood-cells are to be destroyed there appear in the blood-plasma *hemo*lysins; when muscle-cells, *myo*lysins; when nerve cells, *neuro*lysins; when kidney cells, *nephro*toxins, etc. Each of these is active only in the case of one particular kind of cell and in that of no other. Bacteria introduced into the circu-

lation also provoke the elaboration of specific antibodies, *bacteriolysins*, and blood-plasma containing one of these is active only upon the bacillus which, injected into animals, caused its appearance in the blood. Serum obtained by injecting the typhoid bacillus, for instance, will destroy typhoid germs, but it will not dissolve the diphtheria bacillus or any other germ.

Two bodies or substances have been shown experimentally to be necessary in the process, in addition to the cellular material acted upon. One of these is not affected by exposure to relatively high temperatures and has been termed the *immune body* by Ehrlich, while the other, the *complement*, is destroyed when kept at a temperature of 55 degrees C. thirty minutes. The immune body's rôle is to attach itself to the cells or bacteria to be dissolved and to act as a link (hence the name amboceptor, also given it by Ehrlich) between them and the complement, the latter having no affinity for the cellular elements. The complement being endowed, according to Ehrlich, with digestive powers, it is thus brought into contact with the cells and these are dissolved.

But how is the marked specificity witnessed in the destruction of these bacteria and other cellular detritus accounted for in this process? Ehrlich ascribes it exclusively to the immune body. Thus, if cholera bacilli be introduced into an animal the immune body that will appear in the serum obtained from that animal will attach itself to cholera bacilli only. This is because the combining group of the immune body thus obtained will fit only that particular species of microorganism, as a key does its lock, and this applies to all kinds of bacteria and cellular elements to be disposed of in the body fluids; they represent as many different locks, each of which requires its own key. Briefly, although the complement is the solvent, it cannot act upon bacteria or other cellular elements without being linked to them by one of the *many* immune bodies which, acording to Ehrlich and Morgenroth, may occur in the blood-serum.

To Stop a Puncture in Rubber Dam.—W. W. Price, Centerville, S. D., in *Summary*.—A convenient way to stop a puncture in rubber dam where it is not practical to remove same: Select a pledget of absorbent cotton slightly larger than the hole, saturate cotton in sandarac varnish, stretch dam slightly to enlarge puncture, push cotton in hole, leaving it project slightly on either side. I have held back saliva for several hours from a small hole, as the sandarac will harden when it comes in contact with saliva.

The Dental Digest.

PUBLISHED THE LAST WEEK OF EVERY MONTH

At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

LESSONS TO BE LEARNED FROM THE NEWS

So many of our subscribers have expressed their appreciation of our department of News Summary, stating that they received much benefit and edification from same, that we feel warranted in calling special attention to it. Our news service is very comprehensive, but it is of course impossible for the clipping bureaus to give us every dental item of interest and, what is quite as important, a large number of the most valuable ones—valuable in that they serve as warnings to the profession---are religiously kept out of the newspapers. Consequently every item to which we call attention may well be multiplied by two, but enough are reported to warn the thinking practitioner. For years we have been reporting robberies of dental offices, and have frequently directed attention to same, but the number increases faster than could be accounted for by the increase in the profession. Even people who have never been in an office know that dentists always keep on hand more or less material which can be readily converted into cash, and while the amount of same is probably greatly overestimated by the thieves, that does not help the situation. Of course the best plan would be to have a small safe in each office and lock in it at night everything of commercial value. If this is not feasible, the next best method would be to take home at night all such material, as it could be easily carried. Finally, as a last but perhaps efficient resort, all precious metals could be secreted somewhere about the office or laboratory. Aside from the loss to the individual dentist, these many successful robberies simply encourage that sort of thing, and only a determined effort by the entire profession can stop it. The number of fires in dental offices seems larger than it should be in proportion to the number of men practising. A great many of them start from an explosion of gasoline,

a gas jet or Bunsen burner which has been lighted and forgotten, or an exploded vulcanizer, and a very little care would soon reduce the number from these causes. Speaking of vulcanizers, considering the fact that several explode each month it is little short of miraculous that more people are not hurt or even killed. Some of the parts have been driven through the woodwork and walls, and if one of such pieces should strike an individual it would seriously maim him. These dangerous possibilities could be avoided by never employing a vulcanizer beyond a reasonable period, and by a little more care in the use of this apparatus. The large list of fatalities could be brought within reasonable limits by sending patients to specialists in extraction, which is possible, however, only in the largest cities, and by the average dentist possessing himself of more knowledge of organic conditions, anesthesia and resuscitation, and then employing same. The best plan for the man who does his own extracting is of course to have a competent physician, preferably the patient's own, administer the anesthetic. The hemorrhagic tendency should also be looked for and inquired about in each case, for it may turn up most unexpectedly and, through no fault of his, seriously impair if not ruin the dentist's reputation. The majority of the damage suits could be avoided if the dentist would always have a third person present during extractions, and after the operation, if the patient is a stranger or there is any doubt about his or her integrity, this third person could examine the mouth or jaw and see that no damage had been done, and the patient could be induced to admit that the jaw was at least not broken. In passing, let us say that every operator owes it to himself to never administer a general anesthetic except in the presence of a third person. It is a significant fact, and one that should cause both the dental and medical professions, the latter especially, to hide their heads in shame, that most of these suits are brought long after the damage is alleged to have occurred, and many of them are clearly instigated by unscrupulous lawyers and practitioners of both professions on a contingent fee basis. Perhaps it is not out of place to urge the greatest care and antiseptic precautions in extraction work. In this connection we would state that several instances have been chronicled where dentists have had their eyesight injured or even lost by fragments of a broken tooth striking the eyeball during the process of extraction. Spectacles of plain heavy glass would ef-

fectually prevent the occurrence in those cases where the practitioner does not habitually wear glasses. Infection of the hands of operators, especially from ragged crowns and stumps during extraction is by no means rare, but it should be.

In closing we would say that many of our news items, hints and other matter found in the News Summary are furnished through the courtesy and kindness of subscribers. If you are not already a contributor to this department, and are interested in it, we invite and urge you to become one. By so doing you will benefit all and all will benefit you.

Notices.

INDIANA STATE DENTAL ASSOCIATION.

The Indiana State Dental Association held its annual meeting at Indianapolis June 27-29, 1905, and elected the following officers: President, J. Q. Byram, Indianapolis; Vice-president, A. T. White, Newcastle; Secretary, R. A. Adams, Clinton; Treasurer, C. W. Throop, Muncie.

PRINCE EDWARD'S ISLAND DENTAL ASSOCIATION.

The annual meeting of the Prince Edward's Island Dental Association was held at Charlottetown July 28, 1895, and the following officers were elected: President, J. H. Ayers; Vice-President, C. D. Green; Secretary and Treasurer, J. S. Bagnall; Council, J. H. Ayers, C. B. Green, J. S. Bagnall, H. B. Lodge, E. E. Robins.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The National Association of Dental Examiners held its annual meeting at Buffalo July 25, 1905, and elected the following officers: President, H. A. Campbell, Virginia; Vice-president from the West, F. O. Hetrick, Ottawa, Kan.; from the South, F. A. Shotwell, Tennessee; from the East, George E. Mitchell, Haverhill, Mass.; Secretary and Treasurer, Chas. A. Meeker, Newark, N. J.

VIRGINIA STATE DENTAL ASSOCIATION.

The Virginia State Dental Association held its annual meeting at Lynchburg Aug. 2-4, 1905, and elected the following officers: President, J. Lewis Walker, Norfolk; 1st Vice-president, Edward Eggleston, Richmond; 2d Vice-president, F. A. Lee, Lynchburg; 3d Vice-president, E. J. Applewhite, Newport News; 4th Vice-president, W. H. Ewald, Portsmouth; Secretary, George F. Keesee, Richmond; Corresponding Secretary, J. Hall Moore, Richmond. Executive Committee, A. L. Stratford, Richmond; W. E. Morley, So. Boston; Wm. Pitcher, Petersburg.

MICHIGAN STATE DENTAL ASSOCIATION.

The Michigan State Dental Association held its forty-ninth annual meeting at Detroit July 10-12, 1905, and elected the following officers: President, J. J. Green, Ionia; Vice-president, A. L. LeGro, Three Rivers; Secretary, E. R. Spalding, Detroit; Treasurer, J. Ward House, Grand Rapids; Member Board of Trustees, C. H. Worboys, Albion. The next annual meeting will be held at Saginaw.

CONNECTICUT ODONTOLOGICAL SOCIETY.

The fifth annual meeting of the Connecticut Odontological Society was held at Bridgeport, July 20, 1905, and the following officers were elected: President, Edward S. Warnes, Bridgeport; Vice-president, A. H. Wiley, Hartford; Secretary, G. H. Neubauer, Bridgeport; Treasurer, M. C. Hitchcock, Ansonia; Executive Committee, J. E. Beardsley, Bridgeport; L. W. Coley, Bridgeport; George H. Henry, Hartford.

MAINE STATE DENTAL SOCIETY.

The fortieth annual meeting of the Maine State Dental Society was held at Portland July 18-20, 1905, and the following officers were elected: President, F. R. Moore, Calais; Vice-president, George E. Dow, Portland; Secretary, H. A. Kelley, Portland; Treasurer, E. J. Roberts, Augusta; Librarian, E. Bacon, Bar Mills; Executive Committee, F. E. Maxfield, Chairman, Bangor; W. H. Bolton, Portland; F. H. Mead, Bangor; W. R. Bibber, Eastport; W. S. Payson, Castine.

UNION MEETING OF SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

The union meeting of the Seventh and Eighth District Dental Societies will be held at Rochester, Oct. 31-Nov. 1 and 2, 1905. Mark these dates off on your appointment book and attend. It will be time well spent. If you have anything of interest, communicate with the Business Committee—C. F. Bunbury, chairman, Rochester; J. W. Graves, Rochester; S. Eschelman, Buffalo; D. H. Young, Attica; or with the Clinic Committee—G. G. Burns, Rochester; F. Messerschmitt, Rochester.

HARVARD DENTAL ALUMNI ASSOCIATION.

The thirty-fourth annual meeting of the Harvard Dental Alumni Association was held at Boston June 26, 1905, and the following officers were elected for the ensuing year: President, Ned A. Stanley, '84, New Bedford; Vice-president, Arthur W. Eldred, '90, Worcester; Secretary, Waldo E. Boardman, '86, Boston; Treasurer, Harold DeW. Cross, '96, Boston; Executive Committee: Waldo E. Boardman, '86, Chairman ex-officio, Boston; Walter A. Davis, '01, Boston; Arthur A. Libby, '99, Boston. The Council is composed of the officers of the Association.

WALDO E. BOARDMAN, '86, Secretary.

NORTH CAROLINA STATE DENTAL SOCIETY.

The North Carolina State Dental Society held its annual meeting at Waynesville, June 28-30, 1905, and elected the following officers: President, J. S. Betts, Greensboro; 1st Vice-president, C. A. Bland, Charlotte; 2d Vice-president, G. B. Patterson, Fayetteville; Secretary, R. M. Morrow, Burlington; Annual Essayist, R. E. Ware, Shelby. The next annual meeting will be held at High Point.

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

The South Carolina State Dental Association held its annual meeting at White Stone Springs July 19-21, 1905, and elected the following officers: President, G. F. Hair, Bamberg; 1st Vice-president, J. E. Millhouse, Blackville; 2d Vice-president, T. T. Moore, Columbia; Corresponding Secretary, R. A. Smith, Charleston; Recording Secretary, J. W. Kipler, Prosperity. The next annual meeting will be held at White Stone.

NEW JERSEY STATE DENTAL SOCIETY.

The New Jersey State Dental Society held its annual meeting at Asbury Park July 19-22, 1905, and elected the following officers: President, J. E. Duffield, Camden; Vice-president, M. R. Brinkman, Hackensack; Secretary, Chas. A. Meeker, Newark; Treasurer, Henry A. Hull, New Brunswick; Executive Committee, J. G. Halsey, Swedesboro; W. Woolsey, Elizabeth; J. Y. Jaquette, Salem; Harvey Iredell, New Brunswick.

WISCONSIN STATE DENTAL SOCIETY.

The thirty-fifth annual meeting of the Wisconsin State Dental Society was held at Oshkosh July 18-20, 1905, and the following officers were elected: President, F. G. Van Stratum, Hurley; 1st Vice-president, M. L. Christensen, Oshkosh; 2d Vice-president, Mary Hastings, Oshkosh; Secretary, W. H. Mueller, Madison; Treasurer, Adolph Gropper, Milwaukee. The next annual meeting will be held at Madison.

W. H. MUELLER, Sec'y.

PENNSYLVANIA STATE DENTAL SOCIETY.

The annual meeting of the Pennsylvania State Dental Society was held at Philadelphia, June 27-29, 1905, and the following officers were elected: President, H. W. Arthur, Pittsburg; 1st Vice-president, J. T. Lippincott, Philadelphia; 2d Vice-president, W. A. Spencer, Carbondale; Recording Secretary, L. N. Weaver, Philadelphia; Corresponding Secretary, V. S. Jones, Bethlehem; Treasurer, R. H. D. Swing, Philadelphia. Members of the Council for three years, J. A. Libbey, Pittsburg; H. B. McFadden, Philadelphia; H. N. Young, Wilkesbarre. Censors, W. D. DeLong, Reading; A. N. Gaylord, Philadelphia; C. C. Walker, Williamsport; C. C. Taggart, Pittsburg; H. E. Friesell, Pittsburg. The next annual meeting will be held at Philadelphia.

OFFER OF PRIZES BY THE NEW YORK INSTITUTE OF STOMATOLOGY.

With the desire of stimulating investigation in any field of activity directly relating to dental or oral science, the New York Institute of Stomatology offers two prizes for the best papers submitted to it embodying the results of such original research.

The first prize for the best paper will be a gold medal and $250. The second prize for the next best paper, a gold medal and $100.

CONDITIONS.

a. The papers offered for competition must be typewritten in English.

b. Must contain not less than 1,500 nor more than 3,500 words.

c. Must be signed by a motto or *nom de plume.*

d. Must be accompanied by a sealed envelope marked with the same motto or *nom de plume* on the outside, containing the true name as well as the motto of the contestant within.

e. Must be sent to the chairman of the executive committee, Dr. F. Milton Smith, 38 West Thirty-sixth street, on or before March 1, 1906.

JUDGES.

The following gentlemen have consented to act as judges:

Dr. C. N. Johnson of Chicago, Editor of "Dental Review."

Dr. Eugene H. Smith of Boston, Dean of Harvard University Dental School.

Dr. Wilbur F. Litch of Philadelphia, Editor of "Dental Brief."

Under the following

RULES.

1. The papers will be sent to the judges without the sealed envelopes, containing the names of the contestants, which will be retained by the executive committee till the decision of the judges is made.

2. In deciding on the merits of papers offered in competition the judges will be requested to take into consideration the value and character of the research work the results of which are presented, more than the literary character of the essays, but to give the latter due credit.

3. The judges are expressly authorized to decide which, if any, of the papers submitted to them are of sufficient merit to entitle them to the prizes offered, or to withhold the award from all the papers if none is deemed worthy.

4. Authors of the prize papers will be invited to read their essays before a meeting of the institute, as will the writers of other papers of special merit, the institute reserving the right to the first publication of all papers offered in competition.

Papers not used will be promptly returned to the writers. Those read before the institute will be as fully discussed as possible, and when published will be adequately illustrated.

For further information address Dr. F. Milton Smith, 38 West Thirty-sixth street, New York, N. Y.

LATEST DENTAL PATENTS.

12,365. Reissue, Dental Plugger, Alexander W. Wimmer, Chicago.

792,618. Artificial denture, Finis E. Roach, Chicago.

792,669. Headrest attachment, Jacob S. Schaff, Des Plaines, Ill.

792,836. Dental obtunder, Burt A. Loveless, Fulton, N. Y.

793,123. Physicians' adjustable chair, Victor A. Fagerstrom, Rockford, Ill.

793,233. Lamp-holding bracket for dental chairs, John J. Ryan, Paris, France.

793,259. Pocket dentifrice holder, Charles W. Wilson, Toledo, O.

793,681. Headrest for dental chairs, Frank Ritter, Rochester, N. Y.

793,682. Rubber dam holder, John J. Rojo, Mexico.

793,999. Means for securing artificial teeth to dental plates, Leo E. Evslin, Paris, France.

794,006. Dental drill handpiece, George R. Gossling, Walton-on-Thames, Eng.

794,007. Handpiece for dental engines, George R. Gossling, Walton-on-Thames, Eng.

795,084. Artificial upper denture, Louis L. White, Portland, Ore.

News Summary.

F. Z. SMITH, a dentist of Fresno, Cal., died July 10, 1905, of anemia.

J. T. WESTER, 35 years old, a dentist of Rome, Ga., died July 17, 1905.

VASSAR CRENSHAW, formerly a dentist of Athens, Ala., died June 27, 1905.

JOHN LITTLEFIELD, 81 years old, a dentist of Philadelphia, died July 13, 1905.

JOHN BRAUN, a dentist at Allerson, I. T., was killed in a quarrel July 21, 1905.

ROBERT B. CALLOWAY, a dentist of Boston, died of tuberculosis July 13, 1905.

BAYLIS D. EARLE, 30 years old, a dentist of Greenville, S. C., died July 11, 1905.

GEORGE P. KINGSLEY, 72 years old, a dentist of West Freeport, Ill., died July 7, 1905.

H. J. HERMAN, 37 years old, a dentist of Chicago, committed suicide July 14, 1905.

JOSEPH B. MCCASKEY, 66 years old, a dentist of Lancaster, Pa., died July 15, 1905.

S. H. LANGSTROTH, 55 years old, a dentist of St. John, P. E. I., died July 22, 1905.

THEODORE F. HUNTER, 66 years old, a dentist of Cambridge, O., died July 22, 1905.

WILLIAM MCALLISTER HENDRIE, 27 years old, a dentist of Paterson, N. J., died June 19, 1905.

CARLETON A. SMITH, 58 years old, a dentist of Oneida, N. Y., committed suicide July 6, 1905.

E. A. SWANSON, a dentist of Tecumseh, Okla., died of typhoid fever at Colby, Kan., June 13, 1905.

LEWIS M. GRAY, 61 years old, a dentist of Columbus, O., died July 22, 1905, from heart trouble.

MARION WARNER, a dentist of Secor, Ill., was shot and killed by an intoxicated man Aug. 5, 1905.

J. D. MCKEEN, 64 years old, a dentist of Fulton, Ky., died July 30, 1905, of pneumonia and paralysis.

GEORGE M. JONES, 80 years old, formerly a dentist at Anderson, S. C., died at Hartwell, Ga., July 2, 1905.

H. FINLEY HELMS, 30 years old, a dentist of Lincoln, Neb., died July 31, 1905, from cerebral hemorrhage.

JOHN H. PARNELL, 64 years old, a dentist of Ottawa, Can., died Aug. 2, 1905, of paralysis, after a long illness.

R. G. PAYNE, a dentist of Buffalo, N. Y., accidentally shot and killed himself on the Isle of Pines, June 11, 1905.

H. C. HOKE, 50 years old, a dentist of Bridgeport, Ind., died from an overdose of lemon extract July 17, 1905.

CHARLES E. FRANCIS, 78 years old, a dentist of Stamford, Conn., died July 2, 1905, from heart failure and uremic poisoning.

HENRY E. MANN, a dentist of New Bedford, Mass., died suddenly of heart disease June 18, 1905. He had practiced dentistry 50 years.

WILLIAM TAFT, formerly a dentist of Cincinnati, died at Brewster, N. Y., Aug. 3, 1905, where he has resided for the past two years.

EDWARD RULE, 61 years old, formerly a dentist of Minneapolis, fell from a trolley car and was instantly killed in Kansas City, Mo., July 28, 1905.

REMEMBER that every neglected or poorly done piece of work stamps itself ineffaceably on your character.—*Success.*

WIRE CUTTER.—Grind a notch in your plate shears near the joint and you have a good wire cutter.—*Hints.*

SUPERFOCATION.—"'A Case of Superfocation' was given by Dr. —— of Witt."—Chicago (Ill.) *Chronicle.*

PAIN is not punishment, but a divine foghorn warning the wrongdoer off the perilous coast of transgression.—*Good Health.*

DENTIST DECLARED INSANE.—June 23 U. G. Kinnison, a dentist of Aberdeen, Wash., was declared insane and committed to a sanitarium.

THE NEXT STEP.—By crossing insects a stingless bee has been developed. Now let us have the lightning bug and the mosquito crossed, so that we may see the latter coming at night.

BABY KILLED BY TOOTHACHE CURE.—A one-year-old child at Allegheny, Pa., found a phial of creosote which its mother was using on an aching tooth and swallowed the contents, dying shortly after.

SOME men are born cynics, and others live in boarding houses.

TEN YEARS IN PRISON.—Grover Martin, a young dentist at Milton, Idaho, has been found guilty of manslaughter and been sentenced to ten years in prison.

LADIES SAFE AND HARMLESS.—A dentist in Missouri recently advertised —"Laughing gas and vitalized air for extracting. Perfectly safe and harmless lady in attendance."

FIFTEEN YEARS FOR MURDER.—Louis Zorn, a dentist of Kansas City, Mo., shot one of his tenants two years ago, and on July 15 was sentenced to fifteen years in the penitentiary.

CORKS boiled for some time in melted paraffin are thus rendered impervious to air, acids and alkalies. Keep the cork beneath the surface of the paraffin, and heat and allow to cool a number of times.—*Popular Mechanics.*

OZENA.—K. Jarnowski (*Therap. Review*) reports the cure of ozena with injections of antidiphtheric serum; the crust formation ceased, the bad odor disappeared and the sense of smell returned.

QUACK DENTISTS.—By Dr. S. H. Voyles in *Era.*—It is true beyond question that hundreds of people will and do employ quack dentists who would not think of employing a quack physician. This is true because we have made the purely mechanical side of our work the basis for charge, and have given the scientific and professional part free.

PERSONAL CLEANLINESS.—As dentists we should be clean physically and morally if we would achieve the greatest success and enjoyment for ourselves and do the best in us for our patients. There is no greater compliment than to have our patients say that they come to us because we "are so clean;" clean men in every sense of the word.—*Northwestern.*

PHONOWOMAN.—Bleeker—The chap across the hall has a phonograph, hasn't he?

Baxter—No, he's a dentist, and is filling Mrs. Gabbitt's teeth. She is trying to talk with two rubber bands, a napkin, a mirror and a drill in her mouth, that's all.—*Puck.*

MEDICAL PROGRESS.—The materia medica of twenty-five years ago is obsolete. No good doctor now treats symptoms—he neither gives you something to cure your headache nor to settle your stomach. These things are timely ting-a-lings—nature's warning bell—look out! And the doctor tells you so, and charges you a fee sufficient to impress you with the fact that he is no fool, but that you are.—*The Philistine.*

VULCANIZATION UPON METALLIC BASES OF ALLOYS OF SILVER AND COPPER.—During the process of vulcanization of rubber upon metallic bases other than silver and copper, but alloyed with these two metals in certain proportions, the liberated hydrogen sulfid in its nascent state acts upon this silver and copper alloy, forming respectively silver and copper sulfids. This chemical removal of the alloy from the metal base will leave the surface of the base in a more or less pitted condition, and this fresh rough surface offers a suitable place for the ready adhesion of the vulcanite to the metal.—WALTER M. BARTLETT, *Register.*

TREATMENT OF NEURALGIA BY THE ION QUININ.—S. Leduc in *Arch. d'el Med.*—A severe case of four years' standing of trigeminal neuralgia in a woman aged sixty-eight years was treated by applying as the positive pole a compress of absorbent wool soaked in 1 per cent bichlorhydrate of quinin over the painful area, and passing a current of 20 milliampères for thirty minutes. The first application was followed by marked alleviation, and after a second, three days later, the pain ceased.

LADY PASSENGER'S TEETH.—According to the *Daily News,* as a South Western Railway train was nearing Portsmouth the communication cord was pulled, and on the guard going to the compartment from which the order to halt was given he found a lady sitting alone. She could not make herself understood for some time, but after a little trouble it was ascertained that while looking out of the window she had dropped her artificial teeth—hence the stoppage. It is not known whether the teeth have been recovered.—*Brit. Jour. Dent. Sc.*

STERILE-WATER ANESTHESIA.—S. G. Gant (*Medical Record*) describes in detail his method of obtaining local anesthesia by the hypodermic injection of sterile water. The method is simplicity itself. The only thing necessary is to inject enough sterile water to blanch the tissue in the area of operation. The more or less care used in injecting the water will make the difference between failure and success. The cases in which the author has employed it include a number of radical operations. The objections to the method are practically *nil.*

AUTOMOBILE RULES.—Grab der veel vich is in front of you firmly mit both hands and put one foot on der accelerator. Now put der udder on der rheostat und let der elbow chently touch der deodizer. Keep der blow pipe connecting mit der automatic fog vissle closely between der teeth, und let der right elbow be in touch mit der quadruplex while der apex of der left knee was pressed against der spark coil. Keep both eyes on der road in front of you und der rest of your face in der vaggon. Start der driving wheels, repeat slowly der name of your favorite coroner, und leave der rest to fate.—*Whitewater* (Wis.) *Register.*

INFECTED THIRD MOLAR SOCKETS.—The following treatment is suggested: First of all, the use of water—tepid water, sterilized, or, if preferred, the addition of boric acid. After washing thoroughly, the socket may require curetment to insure the removal of any abnormal growth resulting from the infection and the inability of the tissues to heal normally. In case of continued pain camphorated oil gives relief in mild cases, but if extreme anodynes are necessary—one-eighth grain morphia, incorporated with balsam Peru and iodoform (odorless), made into a paste and carried to the floor of the socket in a pledget of cotton and sealed with Fletcher's carbolized resin and cotton, reducing the size of the dressing as the socket closes. In case of enlarged submaxillary and parotid glands, the use of one part tincture of opium and two parts lead water form a happy application for the relief of pain, applied on flannel and wound with a hot cloth.—JAS. W. WINN, *Headlight.*

To Stiffen a Platinum Pin.—Platinum and platino-iridium at times are too weak for posts, whether plain or threaded. To strengthen and stiffen either, flow over the entire surface a thin layer of eighteen or twenty carat plate or solder.—*Dent. Off. and Lab.*

Abscess Probe.—When an abscess appears between two dead teeth it is often difficult to tell which one is decayed. A minute probe made by attaching a small globule of soft solder to the point of a smooth broach will provide an instrument that will follow the path of the pus, thus pointing to the tooth at fault, and at the same time causing no pain to the patient.—Dr. X. Dodel, *Pointers.*

Cautions Against the Use of Adrenalin.—M. I. Wilbert, in *American Journal of Pharmacy.* Neugebauer reports that he has seen several cases of localized gangrene following the use of solutions to which adrenalin had been added for the infiltration method of local anesthesia. Elderly persons were especially liable to this, and he therefore cautions against the use of adrenalin in old persons.

Too Frisky.—A frisky young lady at Kiel
Took a ride on a large Ferris wheel.
At the twentieth round
She looked down toward the ground,
And lost a fine fifty-cent meal.

Removal of Vulcanite from Porcelain Teeth.—Cover the bottom of an iron ladle, such as used for melting lead or zinc, with a layer of dry plaster of Paris; lay the teeth to be cleaned on the surface and sprinkle dry plaster over, completely covering them; place over a big Bunsen flame in draught chamber or in coke furnace, and heat to redness. Then cool down gradually, when on removal the teeth should be found perfectly clean.—Dr. W. T. Finlayson, *Record.*

Sarcoma of the Superior Maxilla Cured by Radiotherapy.—A. Beclere in *Arch. d'El. Med.* The case was of four years' standing. Two operations for removal of the growth had been performed, and the diagnosis confirmed by microscopical examination. Treatment by the Röntgen rays was continued for eight months, at the end of which period the patient was considered to be cured. Injections of bichlorhydrate of quinin were administered throughout the treatment.

Secured His Teeth Anyhow.—A lawyer in Syracuse, N. Y., was considerably startled the other day by a man who rushed into his office with a murderous gleam in his eye. Presently he cooled off enough to say that a "lady friend" had stolen his two sets of false teeth and given them to another man. He said it was bad enough to "gum it," but he could not bear to have his teeth in the possession of a rival even if they were not used. The lawyer wrote the "lady" a letter, and the next day she came to his office while the complainant happened to be there. She threw the teeth on the table with such force that both plates were broken to bits, and then rushed from the office. The complainant said so long as the other fellow did not have the teeth he would let the matter drop.

To Insure Flow of Vulcanite Rubber.—My present practice is to employ a mixture of one part benzine and two parts alcohol, dipping the rubber in this mixture before packing it, and closing the flask with the additional aid of hot water. This does not appreciably retard vulcanization, and it makes flask closure a much easier operation. If, however, there is the slightest opening at a point the rubber will penetrate it.—*Dent. Off. and Lab.*

Proper Use of Floss.—In giving instructions to patients in the use of floss silk for cleaning the proximal surfaces of teeth, caution them against allowing the strand to snap with too great force past the contact points and impinge violently against the gum in the interproximal space. This may in time injure the gum and cause its recession. Teach them also that in removing the floss from the interproximal space it should be drawn out buccally or lingually instead of lifting it occlusally. Drawing the thread laterally will produce better friction against the proximal surfaces of the teeth and dislodge particles of debris more perfectly than snapping it out occlusally.—E. D., *Review.*

Man's a Fool.—As a rule, a man's a fool,
When it's hot he wants it cool,
When it's cool he wants it hot,
Always wants it what it's not.
Man's a fool.—*Sullivan.*

Susceptibility of Blondes to Cocain.—A. E. Thompson, Newport, Ky., in *Brief.* In looking over an article by Dr. J. V. Conzett, entitled "Pressure Anesthesia," I observe he stated that there is an idiosyncrasy which contraindicates the use of cocain for persons of light complexion. I have had the same result in the use of the drug as an anesthetic; one a red-headed boy, another a young lady; both marked cases of poisoning. I have since endeavored to find a cause for this susceptibility to cocain, but have been laughed at for my pains. I am glad this was mentioned in the above-named article, as I should very much like to know why blondes should be more susceptible than brunettes. I could cite more cases, but those mentioned were the worst.

Newspaper Borrowing.—Here is the latest story of the man who is too stingy to take his home paper: "A man who was too economical to subscribe for a paper sent his little boy to borrow the copy taken by his neighbor. In his haste the boy ran over a $4 stand of bees, and in ten minutes looked like a warty summer squash. His cries reached his father, who ran to his assistance, and failing to notice a barbed wire fence ran into that, breaking it down, cutting a handful of flesh from his anatomy, and ruining a $4 pair of pants. The old cow took advantage of the gap in the fence, and got into the cornfield and killed herself eating green corn. Hearing the racket the wife ran out and upset a four-gallon churn full of rich cream into a basket of kittens, drowning the whole litter. In the hurry she dropped a $7 set of false teeth. The baby, left alone, crawled through the spilled milk and into the parlor, ruining a brand new $20 carpet. During the excitement the oldest daughter ran away with the hired man; the dog broke up eleven setting hens, and the calves got out and ate the tails off four fine shirts."—*Kansas City Journal.*

DIVORCES.—July 6 W. N. Hubler, a dentist at Minot, N. D., brought suit for divorce against his wife, charging cruel and inhuman treatment.—July 12 Jessie Meyers filed suit for divorce against her husband, J. E. Meyers, a dentist of St. Louis.—July 10 the wife of Herbert F. Seip, a dentist of Philadelphia, obtained a divorce from him in New York.—July 5 Lydia Wanko brought suit for divorce against her husband, Edward H. Wanko, a dentist of Milwaukee.

TEETH AND APPENDICITIS.—Prof. Symes Thompson of London in a recent lecture advanced the theory that neglected teeth are largely responsible for the increase in appendicitis. In support of this belief he declared that the organisms found in a decayed tooth were also found in the appendix. Some of the lay newspapers are ridiculing the idea, but in view of the fact that so much stomach and bowel disorder has been traced to poisonous secretions from decayed teeth and a filthy mouth the theory seems quite plausible.

TO CONTROL PAIN AFTER EXTRACTING.—A valuable prescription when there is pain after extracting, also for use for spongy gums, is as follows:

Carbolic acid	15 grains.
Boracic acid	½ ounce.
Eucalyptus oil	10 drops.
Tinct. opii	1 ounce.
Tinct. krameria	1 ounce.
Aqua dist.	enough to make 1 fluid ounce.

To be used as a mouth-wash four or five times a day. I always prescribe this after extracting a number of teeth.—Dr. C. R. Baldwin, in *Summary*.

EROSION AND INTERSTITIAL GINGIVITIS.—From clinical observation I am led to believe this disease (erosion) has its origin in mouth environment; this through infection of the mucous follicles or glands. I have noticed complete suspension of erosion in cases associated with interstitial gingivitis when the treatment for the latter was observed with care and regularity, using the medicaments in an atomizer, the patient using a bulb atomizer, and I using it under high pressure. Through the stimulating or massage effect produced by the air pressure upon the mucous surfaces, the excretory deteriorating product is removed before expending itself on the teeth, or the treatment brings about a normal gland excretion.—H. C. REGISTER, *Items*.

ORTHODONTIA; BRIDGE-WORK.—The recognized importance of a full complement of teeth in the restoration or preservation of the normal occlusion not infrequently demands the application of some form of dental bridge-work to the mouths of *young* patients as a means of supplying missing teeth. In such cases the missing teeth should be supplied in the most simple manner possible, usually indicating the employment of simple bands as a means of attachment for the support of artificial teeth, placing the bands around the natural teeth at their largest circumference in order that no possible mechanical irritation may result. On the posterior teeth an *occlusal rest*, forming part of the band, will aid in preventing the band from being forced rootwise or otherwise displaced.—H. J. GOSLEE, *Items*.

RIGHT AD BUT WRONG TEETH.—A woman in Philadelphia wrapped her set of false teeth in a handkerchief and put same in her pocket before starting out on a shopping expedition. When she reached her destination the teeth were missing. A day or two later a man advertised in the newspaper that he had found a set of false teeth, and that the owner could have same on payment of $3. The woman hastened to the address given, and tried in the teeth without looking at them closely. They did not fit, so were hastily removed. During the intervals while she is not using an antiseptic in her mouth she is having a new set made, as you now could not give her a set that any one found.

PROTECTION OF WOUNDS WITH ZINC CHLORID.—Brose's researches were conducted on rabbits and demonstrated convincingly that a wound cauterized with a fifty per cent solution of zinc chlorid is protected against infection. Even with extremely virulent infection, and when an interval of a minute had elapsed between the wound and the cauterizing, the animals were absolutely protected. Notwithstanding this his researches failed to show that zinc chlorid can be regarded as a disinfectant, even in the strongest solutions. His researches further demonstrated that the results of infection differ accordingly as the germs come in light contact with the wound or are driven forcibly into it.

ELECTRIC SWITCHBOARD IN THE DENTAL OFFICE.—No office is complete without an electric switchboard to which may be connected the engine, furnace, lathe, annealer, hot-air syringe, cautery, mouth-lamp, and such other electrical appliances as may be needed to meet the individual wants. This switchboard would be better covered or inclosed in a cabinet admitting the light from the side toward the window, and provided with a door on the opposite side through which we may conveniently operate the switches and yet conceal the entire appliance from the constant view of the patient. In fact, it should be the constant study of the operator to have as little machinery in evidence as possible.—E. A. HONEY.

MUSIC AS A THERAPEUTIC AGENT.—F. S. Kennedy (*Medical Record*) states that in many instances much assistance is to be derived from the intelligent use of music, either vocal or instrumental, as a therapeutic adjunct. Melancholia, insomnia, hysteria, family affliction, business reverses, delirium, pain, fatigue—mental or physical—will all be helped by the beneficial influence of music, rightly used. As a post-operative measure it would have an undoubted influence for good in taking the patient's mind from his bodily distress. So also could "painless" dentistry be relieved of some of its pain and distress by the quieting influence of music, which would, as has been amply demonstrated, produce a pleasanter mental influence during the administration of nitrous oxid or other anesthetic. A German writer recently stated that in a number of test cases in which music was provided during the administration of the anesthetic there was an absence of distress and resistance on the part of the patient, and also an absence or reduction of the post-operative nausea under the same circumstances. To be advantageous the nature of the composition must be carefully selected with a view to the needs of the individual case, and the execution must be as nearly faultless as possible.

TEETH AS PORTALS OF ENTRY FOR TUBERCULOSIS.—Partsch (*Medical Record*) states that it is singular, considering the frequency with which tubercle bacilli are present in the mouth, that infection by way of carious teeth does not oftener occur. He describes the case of a girl of fourteen, who suffered for some time from a painful swelling of the jaw, accompanied by enlargement of the submaxillary glands. It was only after protracted treatment that it was recognized that the condition was a tuberculous periodontitis, which had its origin in the root of a decayed tooth, spread like an ordinary inflammation through the jaw, and caused swelling of the neighboring glands, later spreading to the cervical nodes also.

ONE METHOD OF COLLECTION.—A dentist of Washington, D. C., states that he had a patient who was abundantly able to pay his obligations, but who had let a bill of $50 run for over a year. Recently the delinquent debtor came hotfoot to his office with a terrific toothache. The dentist adjusted the rubber dam and holder, a clamp or two, some cotton rolls, and then seizing a villainous-looking pair of forceps stated that before treating the aching tooth he was going to take out the gold fillings which the patient had refused to pay for. The man let out a yell that startled the policeman on the next block, and tore his pocket in his mad haste to get out his money. He paid the back bill, and when the aching tooth was treated paid for it also. The dentist does not anticipate any more trouble with him.

ILLEGAL PRACTITIONERS.—July 5 a man at Birmingham, Ala., was arrested for practising dentistry without a license and fined $50.—July 1 a young man was arrested at Sawtelle, Cal., for practising dentistry without a license. Instead of paying the fine he decided to fight the case and employed a lawyer. He was convicted and fined $50 and costs, and now the lawyer has obtained judgment against him for $78 in fees.—Aug. 3 two men were arrested at Oakland, Cal., for failure to comply with the state dental law, and both cases were continued under bond.—July 20 three dentists were arrested in Utica, N. Y., for practising without state licenses.—July 10 a man was arrested in New York City, charged with practising dentistry without a license, and was held in $300 bail. It is stated that he has been arrested twice before, the first time paying a fine of $50 and the second time forfeiting his bail.—July 17 two dentists were arrested at Sioux Falls, S. Dak., for practising without a license.

SECRETORY REFLEXES OF THE ORAL MUCOUS MEMBRANE.—By J. M. Heyman (*Russki Vratch—Cosmos*). The author has endeavored to determine the areas of the oral mucous membrane which are particularly susceptible to certain classes of irritation. He has found that the tongue is decidedly responsive to chemical irritation, especially the base, sides and lower surface. Bitter and sweet substances act only upon the base of the organ. The secretion of the parotid is stimulated by intensely sapid substances. The effect of thermal irritation is more pronounced upon the lower lip and the base of the tongue, which are responsive to 55° C. Next in the order of responsiveness to this type of stimulation come the upper lip and the tip of the tongue—to temperatures of 60° C.; and lastly the cheeks—to temperatures of 65° C. The infliction of pain on the mucous membrane of the mouth stimulates sali-

vary secretion, except when the pain is located upon the cheeks. Mechanical irritation induces salivary secretion when directed against the palate and the base and dorsum of the tongue. These different impulses travel through the lingual and glosso-pharyngeal nerves. Investigations have shown that the lingual nerve transmits impulses arising not only at the tip, but also at the base of the organ.

FATALITIES.—July 10 a prominent young physician of Pittsburg died from heart failure in a dentist's chair after the administration of chloroform, but before the extraction was performed.—July 7 a middle-aged man suffered a stroke of paralysis at Wichita, Kan., while having a tooth extracted and died a few hours later.—July 25 a young woman submitted to an operation for a cleft palate at a clinic before the Lewis and Clark Dental Congress, and died without recovering from the anesthetic.—July 25 a women, 49 years old, had sixteen teeth extracted by a Syracuse, N. Y., dentist, chloroform being the anesthetic used, and died without recovering from the drug.—Aug. 4, a young woman, 22 years old, died from nervous collapse brought on by a severe toothache. The day previous a dentist tried to relieve her condition, but she was so nervous that he could do nothing.—Aug. 2 a child, ten years old, died at Philadelphia from blood-poisoning, resulting from an abscess on the root of a tooth.—July 24 a man, 40 years old, died in Chicago from blood-poisoning, which is alleged to have been caused by the careless work of a dentist.—July 14 a young man at Jeffersonville, Ind., died from hemorrhage following the extraction of a tooth.—July 3 a man died at Cincinnati from a peculiar cause. Two months previous while eating he broke off the crown of a tooth which was badly decayed. No attention was paid to it and a little while later an abscess developed. He paid no attention to this until it became very painful, and by that time the glands of his neck were involved and his whole system was so poisoned that he died in the hospital.

PURIFYING MILK BY PRESSURE.—To investigate the effect of pressure on bacteria an apparatus has been devised which is remarkable for having produced what is probably the greatest hydrostatic pressure ever reached—over 450,000 pounds per square inch. The particular object of these experiments was to determine whether the bacteria in milk might not be killed by hydrostatic pressure, so that it would keep a longer time without souring. Moderate pressures were first tried, but appeared to have no effect. The pressures were then increased and notable results were obtained. Milk subjected to pressures of 70 to 100 tons kept from twenty-four to sixty hours longer without souring than milk which had not been subjected to compression. The degree to which the keeping qualities of milk were improved appeared to depend as much on the time for which the pressure was maintained as on the actual pressure reached. Pressures of ninety tons per square inch maintained for an hour prevented milk from souring for from four to six days. Complete sterilization of the milk, however, was in no case effected, even at the highest pressures, and the milk in many cases acquired peculiar tastes and odors on keeping, indicating that certain species of bacteria were killed while others were not.—*Practical Druggist.*

ROBBERIES.—P. S. Regnart, San Jose, Cal., July 12, $40.—Arthur F. Slater, New Haven, Conn., July 16, $200.—C. A. White, New Haven, Conn., July 17, $50.—J. F. McClanahan, Wm. Kimball, Dr. Schooley, Dr. Keefer, all of Washington, D. C., July 2. The losses respectively were $50, $5, $23 and $20—Dr. Flachtemier, De Kalb, Ill., July 25, $55.—H. R. Ribman, Savannah, Ill., July 18, $20.—W. R. Evans and E. P. Blanchard, Portland, Me., July 9, $20 and $30.—P. H. Buckley and S. Irving Moody, Brockton, Mass., July 30, $25 and $30. Attempts were made the same night to enter other dental offices in that town.—Benjamin Percival, Lynn, Mass., Aug. 2, $10.—Walter A. Dorland, Grand Rapids, Mich., July 23, $50.—E. C. Frank, Sedalia, Mo., Aug. 2, $40.—June 30 a dentist at Kansas City, Mo., was awakened by a negro burglar trying to pull a ring from his finger. He closed with the intruder and with the assistance of some men who were attracted by his wife's screams turned the fellow over to the police.—Dr. Kraft, Albuquerque, N. M., June 22, $20.—F. V. Bradley, G. R Clarke, T. R. Richardson, H. T. Williams, J. W. Sniffen, all of New Rochelle, N. Y., lost in the aggregate $500 worth of gold and material July 21.—E. C. Babcock, So. Kaukauna, Wis., July 9, $40.—E. M. Kapitan, Manitowoc, Wis., July 1, $60.—W. H. Lind, Marshfield, Wis., July 28, $30.—J. A. Peaslee, Marinette, Wis., July 12, $75.

PECULIAR EFFECT OF THE RADIUM RAYS.—Experiments have been made by Schwartz (*Blatter fur klin. Hydroth.*) upon the effects of radium upon hen's eggs. A capsule containing 2 cgm. of radium bromid was fastened to the egg by strips of court-plaster, and retained in place for 144 hours. The changes noted after its removal were a slight browning of the white shell, a coagulation of the white with the formation of a thin pellicle, and a greenish gray discoloration of the yolk in an area 4 mm. in diameter. The portion of yolk opposite this area was easily separated from the rest of the yolk, and had the taste of trimethylamin. Schwarz attributes the browning of the shell to a change of color of the organic substances from a sort of dry distillation, and the change of color of the yolk to decomposition of the lutein. The further change in the yolk was attributed to the decomposition of lecithin, for he was able to prove that the influence of radium rays on lecithin produces a marked taste of trimethylamin. It is certain that there is no putrefaction, because radium rays are destructive to putrefactive bacteria. As lecithin is found abundantly in growths such as lupus and carcinoma, the favorable influence of radium rays in these conditions may be traced to the destruction of lecithin.

ACCIDENTS.—July 11 a man at Petersburg, Ind., swallowed a plate carrying three false teeth and for some time was in a serious condition.—July 25 a gasoline tank exploded in the office of a dentist at Clinton, Ia., setting fire to the woodwork, but little damage was done.—Aug. 4 a vulcanizer exploded in the office of J. H. Dwight at Des Moines, Ia., causing a great deal of damage. Dr. Dwight had just stepped out of the laboratory when the explosion occurred, so was not injured.—A. N. Martin, a dentist at Lebanon, Mo., recently broke the skin of his hand on the sharp corner of a patient's decayed tooth. Soon after blood-poisoning set in and he had to visit a specialist at St. Louis, but is now reported to be almost well.—July 1 a man at Ton-

awanda, N. Y., swallowed his false teeth while eating. His plate was cracked and he had been warned not to use it, but he thought he would save the dentist's fee as long as he could, so continued to use it. The latest reports are that half the plate has been located in the throat and the other half in the stomach, so that two operations may be necessary.—July 25 a man at Springfield, O., swallowed his false teeth while eating, and an operation was necessary to relieve him.—July 22 a traveling dentist, who advertised to "extract teeth by a new and secret painless method," pulled 23 teeth for a boy nineteen years old. A few hours later the young man was in terrible agony from lacerated jaws, inflammation and an overdose of cocain, and two physicians were in constant attendance on him for 24 hours. The "painless extractor" left town suddenly on hearing of the matter.

SPINAL ANALGESIA.—BY DR. SILBERMARK. The author (*Wien klin. Woch.—Jour. A. M. A.*) describes his experience in 232 cases at Mosetig's clinic, Vienna. It was found efficient for operations in the genito-urinary system and in the lower extremities, and can be used without hesitation in all subjects over sixteen. Dr. Silbermark considers spinal anesthesia a valuable substitute for general narcosis for debilitated and elderly subjects. From 1 to 2 cc. of a 3 per cent solution of beta eucain in distilled water were injected into the dural sac after from 3 to 5 cc. of the cerebro-spinal fluid had been allowed to escape. The anesthesia lasted from twenty-five minutes to an hour and forty minutes. It was so complete in 170 cases that there was no sensation except that of pressure during the incisions and traction on the soft parts and nerves. No after-effects were observed in 79.5 per cent of the subjects. When the operation was undertaken in silence, without asking the subject if he felt nauseated, etc., it proceeded without disturbances, or if any occurred they were slight and transient. The toxic symptoms indicated bulbar irritation and in five cases there were dyspnea, dilatation of the pupils, cold sweat, and small pulse with tremor of the muscles in two. A few drops of chloroform soon dispelled these phenomena. They occurred exclusively in persons under sixteen or in hard drinkers. The recovery was so rapid that the operation did not have to be interrupted.

DAMAGE SUITS.—Some time ago a student at Northwestern University sued the institution for damages, alleging that he suffered the loss of an eye by an explosion in the chemical laboratory. July 11 the appellate court decided that the University was a charitable institution and the young man was not entitled to damages, nor were any students who suffered injuries while at their studies.—July 19 a dentist at Peoria sued a patient for $65 for professional services. The defendant put in a claim that the dentist was not registered, which turned out to be the case, so had no professional standing in the eyes of the law, and consequently could not collect for his services. He also claimed that the work was unsatisfatory. The judge took the case under advisement.—June 26 a woman at Louisville sued a dentist for $5,000 damages, claiming that he broke and lacerated her jaw while extracting several teeth and that she has since been forced to undergo an operation.—According to newspaper report, the New York State Supreme Court has awarded $2,000 damages against an elevated railroad for an employe's care-

lessness which caused a passenger to lose two teeth.—District Attorney Jerome of New York O. K'd. a bill of $40 for a set of false teeth for a witness who was to give important testimony, claiming that without them the man would be unable to talk, and now Comptroller Grout has refused to pay the bill, so the dentist will probably have to sue the city for his fee.—June 27 a man in Utica, N. Y., sued a dentist to recover a deposit which he had made as part payment on some crowns. The dentist promised the crowns for a certain date, but did not supply them and was unable to show that he had even started on the work, so judgment was given for the plaintiff.—July 3 a woman at Pawtucket, R. I., sued a dentist for $1,000 damages, alleging that while extracting two decayed teeth he broke off a perfectly sound central incisor.

SYMPTOMS OF ULCERATIVE STOMATITIS.—One occasionally sees patients in whom the septic condition of the mouth seems to have reached a stage in which the great power of resistance of the tissues is completely overcome. The teeth are covered with decomposing organic material, and whenever the mucous membrane comes in contact with them deep red patches of inflammation appear or ulcers of considerable size. These are the cases that call for active antiseptic treatment, and they are attended with a certain amount of danger. The mild types of stomatitis are more usually seen in children. That known as ulcerative stomatitis has very definite characteristics. The parts usually affected are the margins of the gums beside the necks of the teeth, and in the situation where the inflammation is most severe small ulcers are usually seen, generally covered with a grayish or yellowish slough. The disease is locally infective, and spreads rapidly round from one side of the jaw to the other, also affecting those parts of the mucous membrane of the cheek which are in contact with the parts of the gums involved. The teeth gradually loosen, and necrose if the condition is not treated. I have noticed that the original site of the disease is frequently in the immediate neighborhood of a loose, dead, septic, deciduous tooth. Removal of the offending tooth, and of others which are very loose, vigorous local antiseptic treatment, with the use of potassium chlorate locally and internally in the form of lozenges, rapidly effect a cure.—NORMAN G. BENNETT, *Brit. Dent. Jour.*

MARRIAGES.—James Blackburn, a dentist of Bloomfield, O., was married to Miss Kathryn Rabe of Bloomfield, July 26.—R. J. Brady, a dentist of Gridley, Ill., was married to Miss Irma M. Drum of Gridley, July 3.—Roy Allen Bush, a dentist of Worcester, Mass., was married to Miss Nellie Bragg Blodgett of Roxbury, June 29.—George H. Camp, a dentist of Cleveland, was married to Miss Maud McLeod of Lisbon, O., July 1.—F. Minor Cooper, a dentist of Marshall, Mo., was married to Miss Ellen T. Woodson of Marshall, June 28.—Leroy Crane, a dentist of Holden, Mo., was married to Miss Edith Lorena Pierce of Holden, June 26.—John H. Cunningham, a dentist of Madison, Wis., was married to Miss Agnes Dempsey of Cottage Grove, June 28.—George Stanley Evans, a dentist of Delaware, O., was married to Miss Roxy Butler of Homer, Ill., July 16.—Arthur H. Gould, a dentist of Cohasset, Mass., was married to Miss Katherine Towle of Cohasset, June 28.—W. J. Harper, a dentist of Elberton, Ga., was married to Miss Dora Truitt of Atlanta, June

24.—W. A. Hastings, a dentist of Owego, N. Y., was married to Miss Eleanor Roney of Scranton, Pa., July 2.—George Stanley Heft, a dentist of Bridgeport, Conn., was married to Miss Esther Marie Seip of Philadelphia, June 10.—Joseph Houlton, a dentist of Boston, was married to Miss Hettie B. Flanegan of Pennsville, N. J., July 26.—Thomas F. Magers, a dentist of St. Louis, was married to Miss Lillian Hulme of St. Louis, June 15.—Warren Marshal, a dentist of Lyndon, Kan., was married to Miss Mayme Cole of Elrod, Ind., July 4.—David M. Matteson, a dentist of Clinton, Mich., was married to Miss Eleanor Jane Tuttle of Clinton, June 28.—H. R. McVey, a dentist of Eddyville, Ia., was married to Miss Tillie Smith of St. Augurs, June 20.—Glenn Morningstar, a dentist of Greenville, O., was married to Miss Maud Ullery of Greenville, July 12.—Walter Bartlett Noe, a dentist of Madison, Wis., was married to Miss Helen Bartlett of Chicago, June 29.—W. H. Overmeyer, a dentist of Chicago, was married to Miss Mayme Fisher of Chicago, July 14.—John F. Roche, a dentist of Palmer, Mass., was married to Miss Elizabeth Healey of Palmer, June 28.—William Francis Sheehan, a dentist of New York City, was married to Miss Mary Catherine Davis of Mt. Pleasant, Mich., Aug. 1.—E. G. Stamper, a dentist of Paducah, Ky., was married to Miss Martha E. McElhaney of Paducah, June 28.—J. M. Stephens, a dentist of Roberson, Ill., was married to Miss Gattye Clayton of Denton, Tex., July 6.—William Woodruff Taylor, a dentist of Warrenton, N. C., was married to Miss Elizabeth Wallace Poindexter of Warrenton, July 5.—John Fred Werner, a dentist of Elkhart, Ind., was married to Miss Mary Elizabeth Chamberlain of Elkhart, June 25.—E. L. Whitman, a dentist of Ann Arbor, Mich., was married to Miss Dora Hamilton of Corunna, June 28.—Thomas Merrill Williams, a dentist of Mt. Vernon, Ia., was married to Miss Lily Horton of Rolfe, July 13.—W. A. Cotton, a dentist of New York City, was married to Miss Florence Aughiltree Rossiter, April 26, at Manila, P. I.

FIRES.—H. G. Hewitt, Healdsburg, Cal., July 5, loss $4,000.—Dr. Burch, Elwood, Ind., June 27; total loss, fully insured.—Sydney Smith and Carl Puryear, Paducah, Ky., Aug. 1, loss $700, fully insured.—J. L. Williams, Boston, July 24, loss $1,500.—New York Dentists, Spokane, Wash., July 8, loss $6,000.—I. S. Kearney, Spokane, July 8, loss $300.—T. D. Ryan, R. J. Goggin and P. H. Sharp, Oconto Falls, Wis., July 20, losses respectively: $500, insurance $350; $150, insurance $200; $1,000, fully insured.

EXAMINING BOARD AFFAIRS.—Last month we stated that the California Board was again having trouble, but that does not give a faint idea of the condition of affairs. July 1 one of the proprietors of a dental parlor filed suit for $50,000 against the Board, alleging that detectives employed by the Board arrested him for practising dentistry without a license, and that he was not allowed to show his certificate until he reached the police station, where he was freed from the charge on producing same. At the meeting of the Board, recently held in San Francisco, 84 students took the examination, and immediately afterwards one member of the Board accused another of giving out some of the questions in advance. Several of the students also testified that they had received same. The Board has refused to make known the results of the examination until the charges are investigated and proved.

The result is that the 84 students don't know where they stand. Some of them have started practice in defiance of the Board and others have made a demand on the governor to force the secretary of the Board to make known the charges, as they allege is required by law. The governor has appointed a commission to look into the matter and prove or disprove the charges. The Board is divided, and a compromise in that quarter is out of the question. The students state that they are perfectly willing to testify as to the examination, but will not do so until the Board has decided the results, as they fear that otherwise their cases will be prejudiced. Fifty-four applicants were examined at the recent meeting in Los Angeles and 41 passed. The Board has also been making trouble for the proprietors of dental parlors who employed students or practitioners who were not licensed, and while of course the action is most commendable, it has merely served to add fuel to the fire.—June 27 the governor of Connecticut appointed an entire new board of dental examiners as follows: Gilbert M. Griswold, Hartford; Alfred E. Fones, Bridgeport; Howard G. Provost, Winchester; David W. Johnson, New Haven; Edward Prentis, New London.—At the July meeting of the District of Columbia Board 19 students were successful in passing the examination.—July 22 the governor of Indiana appointed W. H. Shaffer of North Manchester as a member of the board, to succeed F. M. Sparks of Rushville.—At the July meeting of the Maine Board 23 applicants were successful in passing the examination.—At the June meeting of the Massachusetts Board 66 out of 111 applicants passed the examination successfully.—In our last issue we stated that at the last meeting of the Minnesota Board 11 applicants were successful in passing the examination. This seems to have been a mistake, as later reports state that 53 out of 74 candidates were successful.—At the June meeting of the Montana Board 9 applicants were examined and the following officers were elected: President, D. J. Wait, Helena; secretary, B. J. Keenan, Butte.—July 20 the Nebraska Board met and elected the following officers: President, B. A. Meese, Auburn; secretary, C. F. Ladd, Lincoln.—At the July meeting of the New Jersey Board 46 applicants were successful in passing the examination.—At the July meeting of the North Carolina Board 29 out of 34 applicants passed the examination successfully.—At the July meeting of the North Dakota Board 10 out of 16 applicants were successful in passing the examination.—At the July meeting of the Ohio Board 16 of the 21 applicants passed the examination. The Board elected the following officers: President, H. Barnes, Cleveland; secretary, H. C. Brown, Columbus.—July 17 the governor of Oklahoma announced the following as the Territorial Board: J. Q. Weddell, Kingfisher; R. H. Pendleton, Norman; A. C. Hixon, Guthrie; Fred D. Sparks, Ponca City; A. N. Detrick, Oklahoma City.—At the recent meeting of the Pennsylvania Board 267 were successful out of 324 applicants.—July 18 the governor of Texas appointed the following Board: To serve one year, T. J. Westerfield, Dallas; H. W. Lubben, Galveston; W. G. Jackson, Abilene. To serve two years, C. C. Weaver, Hillsboro; S. G. Duff, Gainesville,; J. H. Grant, Palestine.—At the June meeting of the Virginia Board 26 applicants passed the examination.—At the June meeting of the Wisconsin Board 32 out of 51 applicants passed the examination.